Final

Supplemental Remedial Investigation
Site-Specific Field Sampling Plan,
Site-Specific Safety and Health Plan, and
Site-Specific Unexploded Ordnance Plan Attachments
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q

Fort McClellan
Calhoun County, Alabama

Prepared for:

U.S. Army Corps of Engineers, Mobile District
109 St. Joseph Street
Mobile, Alabama 36602

Prepared by:

IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923

Task Order CK10
Contract No. DACA21-96-D-0018
IT Project No. 796887

September 2000

Revision 1

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Table of Contents

Table of Contents *(Continued)*

Page

Table of Contents *(Continued)*

Page

List of Tables

List of Figures

List of Acronyms

See Attachment 1 for the list of abbreviations and acronyms.

Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK10, IT Corporation (IT) will conduct a supplemental remedial investigation of the Ranges Near Training Area T-24A at Fort McClellan, Calhoun County, Alabama to determine the nature and extent of contamination at the site resulting from U.S. Army chemical waste disposal and training activities. The purpose of this site-specific field-sampling plan is to provide technical guidance for sampling activities at the Ranges Near Training Area T-24A.

The Ranges Near Training Area T-24A consist of the following five parcels:

- Former Chemical Munitions Disposal Area, Parcel 187(7)
- Former Machine Gun Range, Parcel 112Q
- Former Demolition Area, Parcel 113Q-X
- Former Bandholtz Machine Gun Qualification Range, Parcel 213Q
- Bandholtz Field Firing Range, Parcel 214Q.

The Former Chemical Munitions Disposal Area, Parcel 187(7) occupies approximately 1.5 acres. The parcel is fenced and posted. This former chemical munitions disposal training site was used from an unknown date until 1973. Training sites within the parcel included two square burning pits, each measuring approximately 16 by 16 feet. Training activities conducted at this site reportedly included disposal of chemical warfare munitions filled with phosgene, 3-quinuclidinyl benzilate, Sarin, and distilled mustard. The decontaminants reportedly used on this site were supertropical bleach, and Decontamination Solution Number 2. The Former Machine Gun Range, Parcel 112Q covers approximately 1,400 acres. The dates of use and types of ordnance fired at this range are unknown, but the range appears on a 1959 map. A linear east-west trending mound parallel to the access road is present in the western portion of the study area. The Former Demolition Area, Parcel 113Q-X is located in the central portion of the study overlapping the area designated as Parcel 187(7). The Former Demolition Area, Parcel 113Q-X, occupies approximately 3 acres. The dates of use and types of activities that occurred here are unknown, but this area is identified as a demolition area on a 1959 map. The area of Parcel 213Q is approximately 460 acres. Evidence of the firing line of the Former Bandholtz Machine Gun Qualification Range, Parcel 213Q appears as a north-south trending level area along an east-facing slope at the study area. The impact area for this range appears to be approximately 1,600 feet to 2,000 feet due east of the firing line in an area characterized by conical mounds and circular surface depressions interconnected with shallow (less than 1 foot to 3 feet deep)

trenches. Ordnance fired at this range is assumed to have been restricted to small arms. The Bandholtz Field Firing Range, Parcel 214Q has an area of over 1,900 acres. The firing line appears as a northwest-southeast trending level area on the east-facing slope of the study area. The target area and probable impact areas were not observed in a recent site walk by IT, but are likely to be in the vicinity of a west-facing slope approximately 1,000 feet northeast of the firing line. Ordnance fired at this range is assumed to have been restricted to small arms.

The elevation at the Ranges Near Training Area T-24A extends from approximately 985 feet above mean sea level to 1,145 feet above mean sea level, with the ground surface sloping from the southeast to the northwest across the site. A small creek, which bisects several of the ranges, flows north along a small valley to the South Branch Cane Creek.

To address known groundwater contamination and determine whether contamination from fire arm use is present, IT will collect 29 surface soil samples, 8 subsurface soil samples, 37 groundwater samples (from 18 existing and 19 proposed monitoring wells), 7 surface water samples, and 7 sediment samples at this site. Potential contaminant sources at the Ranges Near Training Area T-24A, include chemical warfare material (CWM) decontamination agents and toxic agents and munitions. Chemical analyses of the samples collected during the field program will include volatile organic compounds, semivolatile organic compounds, metals, CWM breakdown products and explosives. In addition, sediment samples will be analyzed for total organic carbon and grain size. Results from these analyses will be integrated with results from site investigation results from nearby Range 24A Fog Oil Drum Storage Area, Parcel 88(6), and Range 24A Multipurpose Range, Parcel 108(7). The combined data will be compared with site-specific screening levels specified in the installation-wide work plan and regulatory agency guidelines.

The possibility of unexploded ordnance (UXO) exists at the Ranges Near Training Area T-24A; therefore, UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at the Ranges Near Training Area T-24A. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance.

Prior to IT conducting any field work at the site, the U.S. Army Corps of Engineers-Huntsville will clear the site for CWM. Therefore, data related to CWM will not be collected as part of this supplemental remedial investigation. A CWM investigation will be provided in the CWM Site

Engineering Evaluation/Cost Analysis that is being proposed by U.S. Army Corps of Engineers-Huntsville.

This site-specific field-sampling plan attachment to the installation-wide sampling and analysis plan (SAP) for Ranges Near Training Area T-24A will be used in conjunction with the site-specific safety and health plan, the site-specific UXO safety plan, the installation-wide work plan, and the SAP. The SAP includes the installation-wide safety and health plan, waste management plan, ordnance and explosives management plan and quality assurance plan. Site-specific hazard analyses are included in the site-specific health and safety plan and site-specific UXO safety plan.

1.0 Project Description

1.1 Introduction

The U.S. Army is conducting studies of the environmental impact of suspected contaminants at Fort McClellan (FTMC) in Calhoun County, Alabama, under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE has contracted IT Corporation (IT) to provide environmental services for the supplemental remedial investigation (RI) of the Former Chemical Munitions Disposal Area, Training Area T-24A, Parcel 187(7), and site investigations (SI) of:

- The Former Machine Gun Range, Parcel 112Q
- The Former Demolition Area, Parcel 113Q-X
- Former Bandholtz Machine Gun Qualifying Range, Parcel 213Q
- Former Bandholtz Field Firing Range, Parcel 214Q.

The investigations are being performed concurrently under Task Order CK10, Contract Number DACA21-96-D-0018 and are referred to in this document hereinafter as the supplemental RI at the Ranges Near Training Area T-24A.

This supplemental RI site-specific field sampling plan (SFSP) attachment to the installation-wide sampling and analysis plan (SAP) (IT, 2000a) for FTMC has been prepared to provide technical guidance and rationale for sample collection and analysis at the Ranges near Training Area T-24, (Figure 1-1). The objective of this supplemental RI is to define the extent of benzene contamination in groundwater associated with of the Former Chemical Munitions Disposal Area, Parcel 187(7), and determine whether lead contamination from the Former Machine Gun Range, Parcel 112Q, Former Demolition Area, Parcel 113Q-X, Former Bandholtz Machine Gun Qualifying Range, Parcel 213Q, and Former Bandholtz Field Firing Range, Parcel 214Q is present. IT will collect samples at these parcels as part of a supplemental RI effort to characterize the source and the nature and extent of groundwater contamination. The data collected will be used to evaluate the level of risk to human health and the environment posed by releases of chemicals. The supplemental RI SFSP will be used in conjunction with the site-specific safety and health plan (SSHP), and the site-specific unexploded ordnance (UXO) safety plan, and the installation-wide work plan (WP) (IT, 1998) and SAP. The SAP includes the installation-wide safety and health plan (SHP), waste management plan, ordnance and explosives management plan, and quality assurance plan (QAP).

1.2 FTMC Site Description and History

FTMC is located in the foothills of the Appalachian Mountains of northeastern Alabama near the cities of Anniston and Weaver in Calhoun County. FTMC is approximately 60 miles northeast of Birmingham, 75 miles northwest of Auburn, and 95 miles west of Atlanta, Georgia. FTMC consists of two main areas of government-owned properties: the Main Post and Pelham Range. A third area, designated Choccolocco Corridor, was previously leased from the state of Alabama, however the lease was terminated in May 1998. The size of each property is presented below:

- Main Post 18,929 acres
- Pelham Range 22,245 acres
- Choccolocco Corridor 4,488 acres (formerly leased).

The Main Post is bounded on the east by the Choccolocco Corridor, which connects the Main Post with the Talladega National Forest. Pelham Range is located approximately 5 miles west of the Main Post and adjoins the Anniston Army Depot on the southwest. Pelham Range is bordered on the east by U.S Highway 431 and privately owned land.

FTMC is under the jurisdiction of the U.S. Army Training and Doctrine Command. Until September 1999, the installation housed three major organizations, including the U.S. Army Military Police School, the U.S. Army Chemical School, and the Training Center (under the direction of the training brigade), in addition to other major support units and tenants.

The U.S. government purchased 18,929 acres of land near Anniston in 1917 for use as an artillery range and a training camp due to the outbreak of World War I. The site was named Camp McClellan in honor of Major General George B. McClellan, a former leader of the Union Army during the Civil War. Camp McClellan was used to train troops for World War I from 1917 until the armistice. It was then designated as a demobilization center. Between 1919 and 1929, Camp McClellan served as a training area for active army units and other civilian elements. Camp McClellan was redesignated as FTMC in 1929 and continued to serve as a training area.

In 1940, the government acquired an additional 22,245 acres west of FTMC. This tract of land was named Pelham Range. In 1941, the Alabama legislature leased approximately 4,488 acres to the U.S. government to provide an access corridor from the Main Post to Talladega National Forest. This corridor formerly provided access to additional woodlands for training. This lease was terminated in May 1998.

The U.S. Army operated the Chemical Corps School at FTMC from 1951 until the school was deactivated in 1973. The Chemical Corps School offered advanced training in all phases of chemical, biological, and radiological warfare to students from all branches of the military service.

Until its closure in May 1999, activities at FTMC could be divided into support activities, academic training, and practical training. Support activities included housing, feeding, and moving individuals during training. Academic training included classroom, laboratory, and field instruction. Practical training included weapons, artillery and explosives, vehicle operation and maintenance, and physical and tactical training activities.

1.3 Site Description and History

The Ranges Near Training Area T-24A, consist of the following five parcels:

- Former Chemical Munitions Disposal Area, Training Area T-24A, Parcel 187(7)
- Former Machine Gun Range, Parcel 112Q
- Former Demolition Area, Parcel 113Q-X
- Former Bandholtz Machine Gun Qualification Range, Parcel 213Q
- Bandholtz Field Firing Range, Parcel 214Q.

The elevation at the Ranges Near Training Area T-24A ranges from approximately 985 feet to 1,145 feet, with the ground surface sloping from the southeast to the northwest across the site. A small creek, which bisects several of the ranges, flows north along a small valley to the South Branch Cane Creek.

The soils at the Ranges Near Training Area T-24A are composed of the Anniston and Allen Series soils. The Anniston and Allen Series of soils consists of strongly acid, deep, well drained soils that have developed in old local alluvium. The parent material washed from the adjacent higher lying Linker, Muskingum, Enders, and Montevallo soils, which developed from weathered sandstone, shale, and quartzite. These sites contain sandstone and quartzite gravel and cobbles, which measure as much as 8 inches in diameter on the surface and throughout the soil. Infiltration and runoff are medium, permeability is moderate, and the capacity for available moisture is high. Organic matter is moderately low (U.S. Department of Agriculture, 1961).

The combined area of the five parcels is approximately 3,900 acres as shown on Figure 1-1. Two additional parcels, Range 24A Multi-Purpose Range, Parcel 108(7)/82Q-X, and the Fog Oil Drum Storage, Parcel 88(6), overlap the area encompassing the Ranges near Training Area T24A, and were the subject of separate SIs in December 1999. A summary of the results of the SIs is presented in Section 2.0. A description of the five parcels associated with the Ranges Near Training Area T-24A is presented in the following subsections.

1.3.1 Former Chemical Munitions Disposal Area, Training Area T-24A, Parcel 187(7) Site Description and History

The Former Chemical Munitions Disposal Area, Parcel 187(7) occupies approximately 1.5 acres and is located near the center of several overlapping ranges (Figure 1-2). The parcel is fenced and posted. This former chemical munitions disposal training site was used from an unknown date until 1973. Training sites within the parcel included two square burning pits, each measuring approximately 16 by 16 feet, however the precise locations of these pits is unknown. Training activities conducted at this site reportedly included disposal of chemical warfare munitions filled with:

- Phosgene (CG)
- 3-quinuclidinyl benzilate (BZ)
- Sarin (GB)
- Distilled mustard (HD).

CG. Phosgene (carbonyl chloride) is normally a chemical agent with short duration of effectiveness and was used extensively in World War I. CG has a low boiling point and hydrolyzes to hydrogen chloride and carbon dioxide. Benzene is commonly used as a solvent with CG.

BZ. 3-quinuclidinyl benzilate is an incapacitating agent. BZ is packed in munitions in micropulverized form and is used in burning mixtures, which aerosolize the agent.

GB. Sarin is a toxic agent. It is a colorless liquid, which has variable hydrolyses rates and hydrolyses products depending on the pH. GB has a high boiling point.

HD. Distilled mustard (bis-(2-chloroethyl)) sulfide is an oily chemical that has a high boiling point. HD was used extensively in World War I. HD hydrolyzes quickly in nature. If diluted, it degrades to form thiodiglycol and if concentrated, it forms either 1,4-dithiane or 1,4-oxathiane.

The decontaminants reportedly used on this site were:

- Supertropical bleach (STB)
- Decontamination Solution Number 2 (DS2).

STB. STB is referred to as bleach, bleaching powder, supertropical bleach, bleaching material, or chlorinated lime. STB is a white powder containing about 30 percent available chlorine (U.S. Department of Army and Air Force, 1963).

DS2. DS2 is a clear solution general-purpose decontaminant consisting of 70 percent diethylenetriamine, 28 percent solvent (ethylene glycol monomethylether), and 2 percent active agent booster (sodium hydroxide). DS2 decontaminant reacts with GB and HD to effectively reduce their hazard within 5 minutes of application. It is effective for all toxic chemical agents. DS2 was applied manually or by using a portable decontaminating apparatus such as the M11 (U.S. Department of Army and Air Force, 1963).

1.3.2 Former Machine Gun Range, Parcel 112Q, Site Description and History

The Former Machine Gun Range, Parcel 112Q covers approximately 1,400 acres and is shown on Figure 1-1. The dates of use and types of ordnance fired at this range are unknown, but the range appears on a 1959 map. The direction of fire is toward the south and the surface danger zone (SDZ) is displayed on the map. During a recent site walk by IT, a linear east-west trending mound parallel to the access road was observed in the western portion of the study area (Figure 1-2). The mound is assumed to be the target area or a portion of the target area for this range, however a distinctive firing line could not be determined. Additional information regarding the Former Machine Gun Range is not available (Environmental Science and Engineering, Inc. [ESE], 1998).

1.3.3 Former Demolition Area, Parcel 113Q-X, Site Description and History

The Former Demolition Area, Parcel 113Q-X, is located in the central portion of the study area (Figure 1-1), overlapping the area designated as Parcel 187(7). The Former Demolition Area, Parcel 113Q-X, occupies approximately 3 acres. The dates of use and types of activities that occurred here are unknown, but this area is identified as a demolition area on a 1959 map.

1.3.4 Former Bandholtz Machine Gun Qualification Range, Parcel 213Q, Site Description and History

A map entitled "Ranges, 1948" (New South Associates, 1992) identifies a range in the southeast area of the Main Post as the Former Bandholtz Machine Gun Qualification Range, Parcel 213Q, and shows the approximate location (Figure 1-1). The area of Parcel 213Q is approximately 460 acres. Evidence of the firing line of the Former Bandholtz Machine Gun Qualification Range, Parcel 213Q appears as a north-south trending level area along an east-facing slope at the study area (Figure 1-2). The impact area for this range appears to be approximately 1,600 feet to 2,000 feet due east of the firing line in an area characterized by conical mounds and circular surface depressions interconnected with shallow (less than 1 to 3 feet deep) trenches (Figure 1-2). Ordnance fired at this range is assumed to have been restricted to small arms. Additional information is not available regarding the Former Bandholtz Machine Gun Qualification Range, dates of use, or operation (Environmental Science and Engineering, Inc. [ESE], 1998).

1.3.5 Former Bandholtz Field Firing Range, Parcel 214Q, Site Description and History

The map entitled "Ranges, 1948," (New South Associates, 1992) identifies a range in the southeast area of the Main Post as Bandholtz Field Firing Range No. 2. The direction of fire is toward the northeast and the SDZ is displayed (Figure 1-1). The area of this range is over 1,900 acres. The firing line appears as a northwest-southeast trending level area on the east-facing slope of the study area (Figure 1-2). The target area and probable impact areas were not observed in a recent site walk by IT, but are likely to be in the vicinity of a west-facing slope approximately 1,000 feet northeast of the firing line. Ordnance fired at this range is assumed to have been restricted to small arms. Additional information is not available regarding this range, dates of use, or operation.

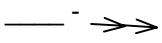
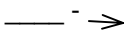
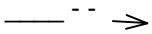
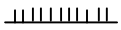
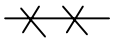
1.4 Ranges Near Training Area T-24A Historic Aerial Photographic Analysis

The following descriptions were obtained from aerial photographs taken in 1949, 1954, 1957, 1961, 1969, and 1972 (Figures 1-3 through 1-8) (U.S. Environmental Protection Agency [EPA], 1983). The approximate layout of Parcel 187(7), and portions of the boundaries of Parcel 112Q, 213Q, and 214Q are shown for reference. The legend for the aerial photograph descriptions is included in Table 1-1.

March 2, 1949, Figure 1-3. A firing range is present at the Ranges Near Training Area T- 24A. The ranges are situated in a shallow natural basin, through which a number of drainage routes pass en route to the creek bed to the north. Some of these routes have incised into the range surface. The main vehicle access road enters the range from the northwest. Indistinct, possibly mounded material is noted on a small spur of this road north of the site. Activity at the

Table 1-1

Legend for Aerial Photographs
Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

T	Tank
GS	Ground Scar
MM	Mounded Material
SL	Standing Liquid
GST	Ground Stain
	Culvert
	Wetlands
	Access Road
	Depressions
	Ditched Drainage
	Drainage
	Intermittent Drainage
	Escarpment
	Fence
	Historical Boundary

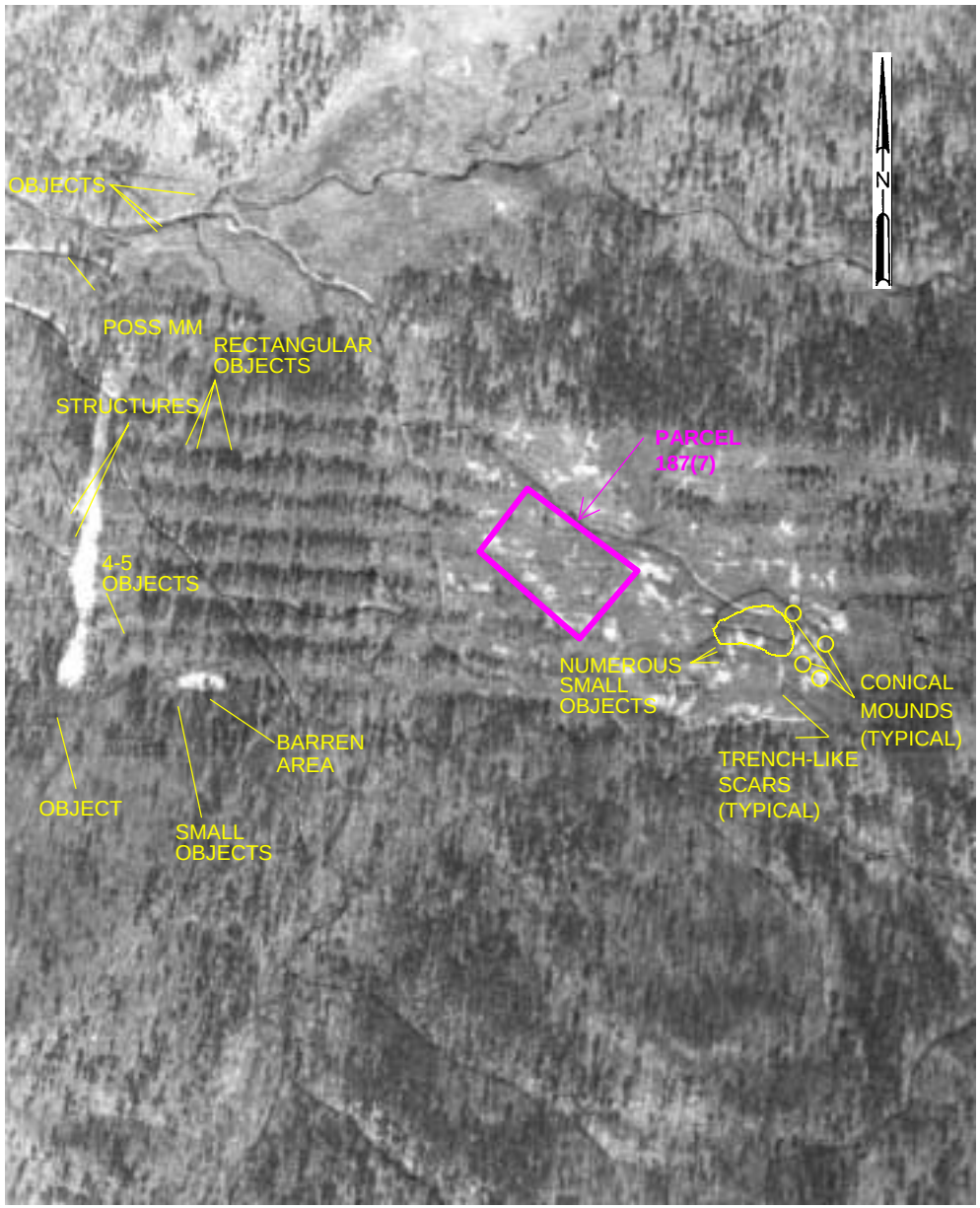


Figure 1-3

Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q and 214Q

March 2, 1949
Aerial Photography
Approximate Scale 1”=600’

Source: U.S. EPA, 1983,
Research and Development
Fort McClellan 24 Alpha, T-38, Range J, Alabama
(TS-PIC-83003)
Environmental Photographic Interpretation Center
Environmental Monitoring System Laboratory

U.S. Army Corps of Engineers
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Contract No. DACA21-96-D-0018

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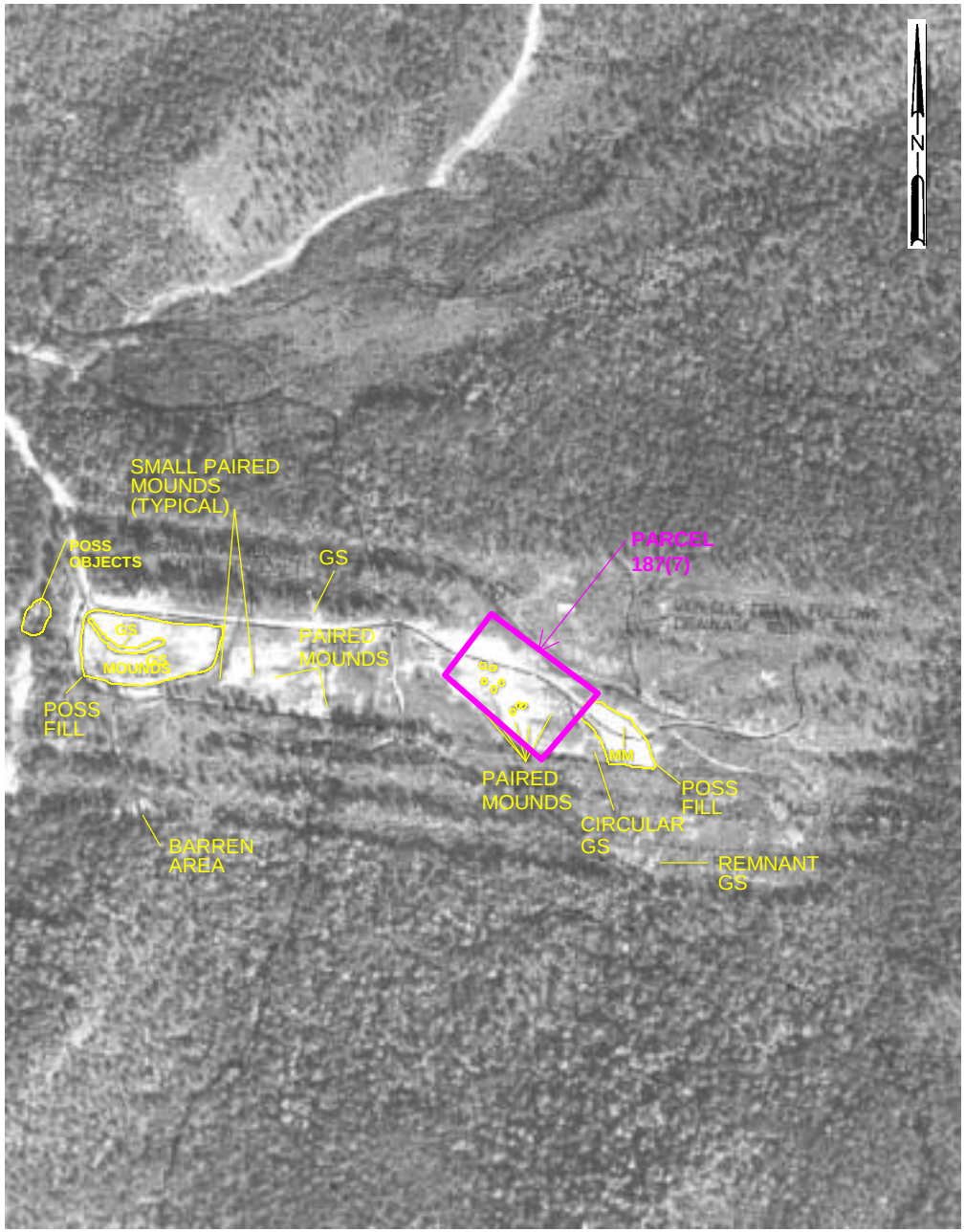

Figure 1-4

Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q and 214Q

October 17, 1954
Aerial Photography
Approximate Scale 1”=600’

Source: U.S. EPA, 1983,
Research and Development
Fort McClellan 24 Alpha, T-38, Range J, Alabama
(TS-PIC-83003)
Environmental Photographic Interpretation Center
Environmental Monitoring System Laboratory

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Contract No. DACA21-96-D-0018

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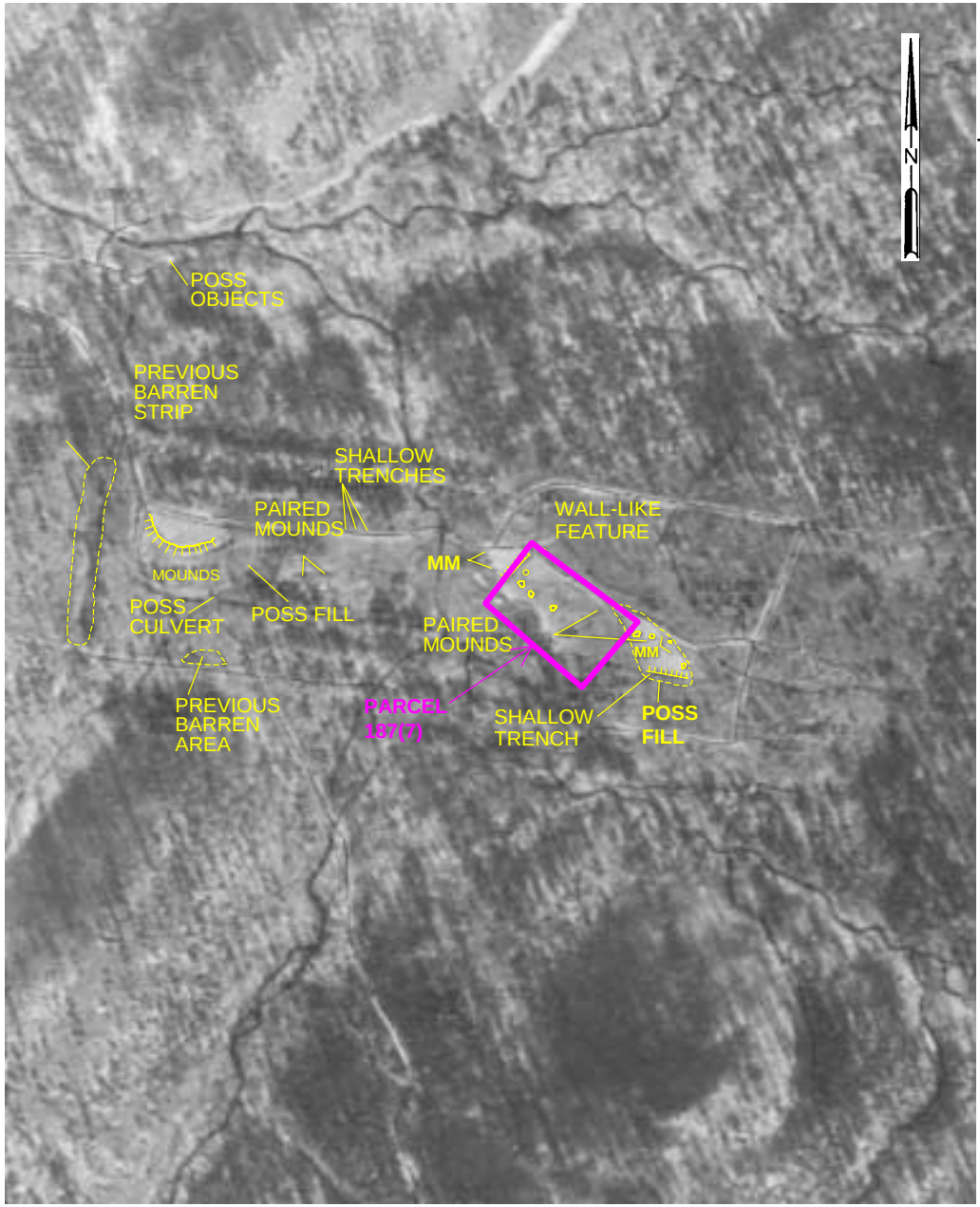

Figure 1-5

Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q and 214Q

December 21, 1957
Aerial Photography
Approximate Scale 1”=600’

Source: U.S. EPA, 1983,
Research and Development
Fort McClellan 24 Alpha, T-38, Range J, Alabama
(TS-PIC-83003)
Environmental Photographic Interpretation Center
Environmental Monitoring System Laboratory

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Mobile District
Fort McClellan
Calhoun County, Alabama
Contract No. DACA21-96-D-0018

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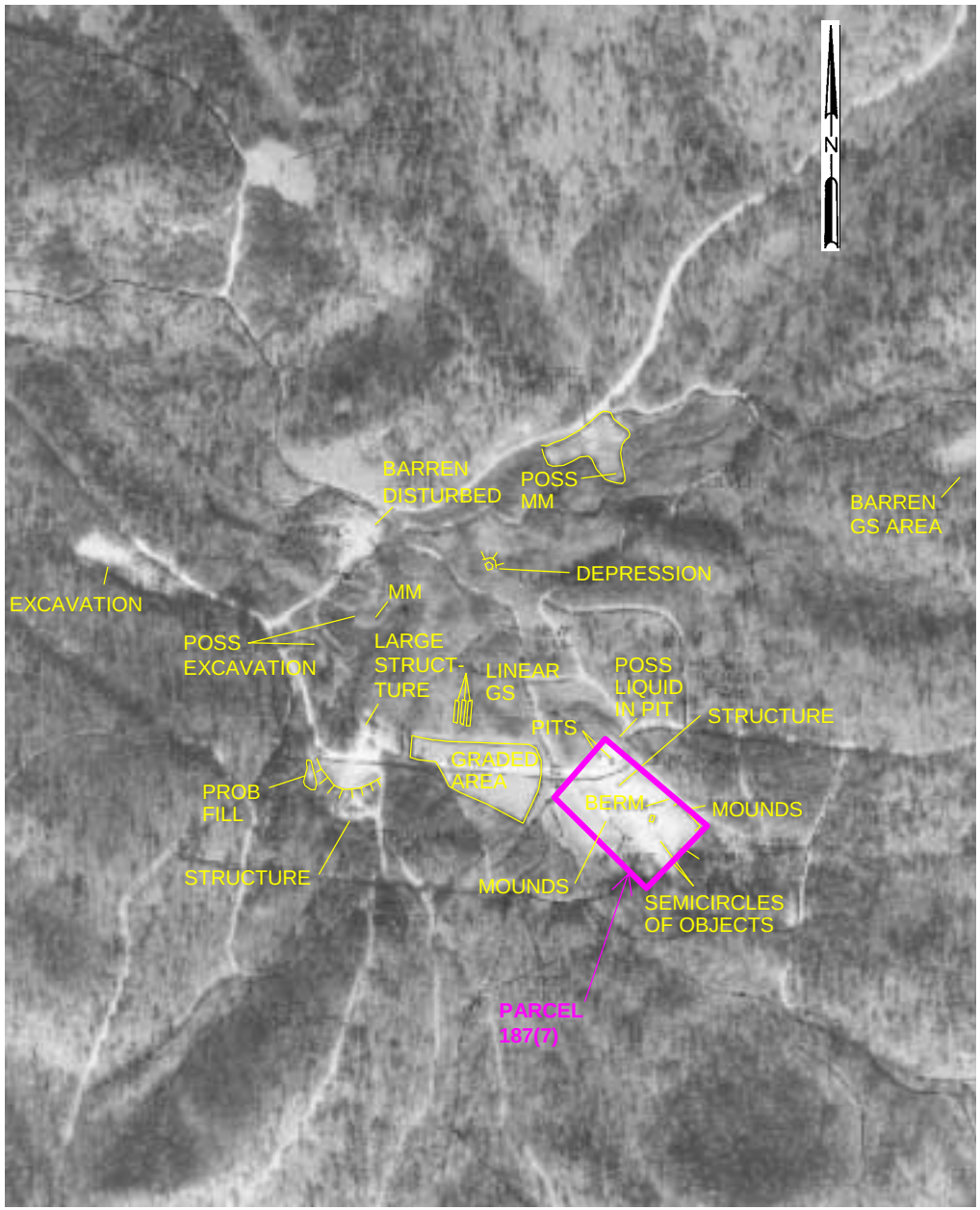

Figure 1-8

Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q and 214Q

January 8, 1972
Aerial Photography
Approximate Scale 1”=600’

Source: U.S. EPA, 1983,
Research and Development
Fort McClellan 24 Alpha, T-38, Range J, Alabama
(TS-PIC-83003)
Environmental Photographic Interpretation Center
Environmental Monitoring System Laboratory

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Contract No. DACA21-96-D-0018

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range is concentrated around the light-toned barren strip, which borders the western end of the range. This strip probably serves as the firing area. Two structures, possibly used for storage or observation, stand near the center of the strip. Four or five rectangular objects are present south of the structures. A larger, indistinct object lies at the southern end of the strip; a subtle, linear ground scar (not annotated) is visible just north of this object. A possible utility easement leads from the west to the center of the barren strip. A primitive vehicle trail is visible over this feature. Seven parallel rows of trees stand immediately east of the barren strip; the intervals between the rows probably serve as firing corridors. Trail-like surface markings lead eastward from the intervals and continue across the length of the range. The cause or function of these markings is not clear.

Dark-toned areas are present along the drainage bed in the northwest section of the tree row area. Surface wetness or dense ground vegetation may have caused this tonality contrast. Three rectangular objects (or possible small structures) are noted to the north, along the range border. A primitive trail from the range access road leads to these objects. A barren area is cut into a hillside south of the tree rows; a number of small dark objects are scattered across its western surface. Vehicle tracks from the aforementioned barren strip lead to this area. The eastern half of the range is largely grass-covered; however, the numerous barren patches here give the area a mottled appearance. A number of short ground scars (typical examples of these are annotated) are scattered across this area in random directions. These scars consist of a dark, shallow trench between two light-toned, sometimes mounded streaks.

Many small objects, several feet in length, are scattered across the eastern range area. A concentration of these objects is shown at the end of a probable vehicle trail, which follows a drainage bed into the area. Four conical mounds, possibly used for camera observation, stand at the eastern end of this area. A small dark spot or object is visible atop each of the mounds. These mounds were observed in a recent site walk by IT. Three objects lie adjacent to the creek bed northwest of the range. The two southern objects are light-toned and indistinct; the northern object appears to be cylindrical. No vehicle access to these objects is evident.

October 17, 1954, Figure 1-4. Changes at the Ranges near Training Area T- 24A indicate that the area no longer serves as a firing range and may now support disposal activities. The barren strip visible along the western end of the site in 1949 is now partially overgrown, and the two structures previously noted here have been removed. A number of possible small objects are scattered over the center of the old strip; however, none of the other objects observed in 1949 are

visible. The barren area isolated near the southwest corner of the site is also in disuse. Activity is now concentrated across the western/central area of the site. Several tree rows that previously stood here have been cleared, and the surface is largely barren and scarred. Access to this area is provided by the improved roadway which approaches the Ranges Near Training Area T-24A from the northwest. Two drainage ditches border the southern and western sides of the area; the western ditch is culverted beneath the entrance roadway.

The western section of the site is barren and slightly elevated, indicting possible filling activity. A very light-toned, crescent-shaped ground scar is present across the center of this section. Numerous mounds, including a pair of abutting identical mounds, which form a single "paired mound" (not annotated), are present south of the scar. Several small paired mounds appear on the scarred area east of the possible fill. Two larger sets of paired mounds are also present on this area. The surfaces of these are probably vegetated. A scarred, barren area is noted along the roadway to the north of this area. The central section of the site is also barren and scarred. A culverted earthen bridge passes over the drainage bed on the west side of this section to provide vehicle access. Numerous crater-like depressions are visible here; the interiors of these depressions are light in tone and therefore are possibly not used for burning. A number of the aforementioned various-sized paired mounds are present in the central section; most of these are unvegetated.

An elevated and grade-scarred area, possibly a fill, is noted in the east central site section. Dark mounded material is visible on the northeast surface of this area. Level circular scars, possibly filled pits, are present adjacent to the southwest side of the fill. A probable drainage ditch is cut along the south side of this area; the ditch appears to lead westward. The eastern portion of the Ranges Near Training Area T-24A has largely revegetated, and only remnants of several of the trench-like ground scars remain visible. The small objects and conical mounds here in 1949 are no longer evident. Vehicle tracks lead onto this area from the more active western sections. Drainage patterns around the site are similar to those in 1949, although the seasonal foliage canopy has obscured their details. Drainage through the site has been somewhat altered, due in part to the changing site activities.

A new roadway has been formed northwest of the site. A small bridge accommodates the road over the creek bed. A small spur of the road leads to a low barren area south of the creek. The possible mounded material and assorted objects observed in this area in 1949 are no longer present.

December 21, 1957, Figure 1-5. Remnant features of the old firing range have become less evident, while development of possible disposal areas within the Ranges Near Training Area T-24A continues. The previous barren strip and the smaller barren area have now revegetated. The possible objects observed on the strip in 1949 and 1954 are no longer present. A perimeter road now surrounds active areas of the Ranges Near Training Area T-24A. Main access to the site continues to be from the northwest; however, new roads provide secondary access from the south and east. The crescent-shaped scar remains in the western section of the site. The earlier possible fill area around the scar is grass-covered; the resulting contrast reveals that the scar is an escarpment, sloping down to the south. A possible ditch is present along the south side of the scar. The semicircular area north of the scar is level and somewhat elevated above the earlier fill. The mounds remain south of the scar. The area east of the possible western fill area has partially revegetated. Two of the paired mounds remain visible here. Three shallow trenches are noted along the perimeter road, northeast of the mounds. The function of these trenches is undetermined.

The drainage ditch system around the western section of the site remains intact. Partial surface revegetation has given the central section of the Ranges Near Training Area T-24A an overall darker tone. Several of the crater-like depressions noted in 1954 have apparently been filled, while several new depressions have become evident. The depressions remain empty. Three paired mounds are noted southeast of the depressions. A linear wall-like feature is now present across the northwest end of the central site section. A shallow trench may parallel the northwest face of the feature, and low mounds of indistinct light-toned material are scattered to the west. The small, earlier possible fill remains east of the central site section. The surface here exhibits less scarring and is somewhat darker in tone, possibly due to partial revegetation. Several crater-like depressions and a paired mound are now present in this area. An escarpment has been cut into the elevated area along the south side of the fill. A shallow trench has formed parallel to the northern face of the escarpment and appears to connect with the adjacent drainage ditch.

Two shallow trenches are present along the vehicle trail that intersects the eastern perimeter road. These trenches are identical to those noted in the western section of the site. The eastern end of the site is heavily vegetated and appears to be in disuse. Excluding the aforementioned new access roads, features external to the Ranges Near Training Area T-24A are basically unchanged. Several small possible objects are present on the barren area that is adjacent to the creek bed northwest of the site.

November 29, 1961, Figure 1-6. Roads around the Ranges Near Training Area T-24A have been markedly improved, and new access routes now serve the southwest and southeast corners of the site. The prominent crescent-shaped escarpment remains in the western section of the site. Two objects or mounds and indistinct mounded material are present on the elevated, semicircular barren and scarred area north of the escarpment. A scarred, probable fill area is noted immediately west of the escarpment. The fill has eliminated the previous ditch through this area. Paired mounds remain on the now barren area south of the escarpment. Activity here appears to be centered around the larger, southernmost mound; dark material is mounded to the west of it. The improved southern access road into the site now extends directly to the western site section. The area east of the western section is heavily vegetated and apparently inactive. The three trenches previously observed along the perimeter road north of this area are no longer evident. The central site section exhibits new surface scarring and disruption. The wall-like feature remains; however, the possible parallel ditch noted in 1957 is not evident. Four revegetating depressions are visible southeast of the wall. The area immediately around the depressions has a thick vegetation cover. The paired mounds (not annotated) in this area have also vegetated.

Additional depressions are noted on the possible fill area to the east. The surface of this area exhibits new scarring. The escarpment and adjacent shallow trench (not annotated) remain visible along the south side of the area; the ditch previously connected with the trench is no longer evident. A vehicle trail leads northward from the possible fill area to a scarred clearing north of the site perimeter road. Small objects are scattered adjacent to the clearing. The far eastern end of the site (outside the perimeter road) continues to appear inactive. The trenches previously noted along the vehicle trail into this area are no longer visible. The small bridge northwest of the site appears to be out. None of the objects observed in the adjacent clearing in 1957 are evident.

November 20, 1969, Figure 1-7. Extensive changes have occurred within the Ranges Near Training Area T-24A and across the associated area to the north. Access into the Ranges Near Training Area T-24A is similar to that noted in 1961; however, the perimeter road and southern entrance routes are darker in tone, possibly due to reduced use. The perimeter road has been delineated to increase clarity. New access roads from the south and west augment the existing routes serving the western site section. The active western section of the Ranges Near Training Area T-24A has a partial grass cover. The crescent-shaped escarpment here remains visible, although it appears to have eroded and is less prominent. A rectangular structure is noted on the

edge of this feature. A mound stands on the area north of the escarpment. The objects seen here in 1961 have been removed. The small fill area immediately west of the escarpment is highly disrupted and may have been excavated. A small possible drainage ditch flows from the fill area into the adjacent culvert. The assorted paired mounds and mounded material remains south of the escarpment. A new small structure is present immediately south of the large mound.

The central section of the site has been cleared and now has a low vegetation cover. The northern portion of this area is lighter in tone and exhibits subtle grading scars. The central drainage route through the site has been altered within this cleared area. A perimeter road bridge has been constructed over the drainage bed. A small structure is present just southeast of the bridge. Heavy surface disruption and scarring are noted along the stream bed north of the bridge. The site section east of the central drainage bed is now barren and graded smooth. A fence has been erected around the more elevated eastern half of this section. The ground surface inside the fence is light-toned. Two crater-like depressions are present here; the interiors of these may be discolored or contain material. Two small objects are present northwest of the larger depression. Two structures are noted adjacent to the fenced area. An indistinct white object or ground scar (not annotated) is visible at the fence gate.

A very light-toned barren area is now present northwest of the fenced area across the site perimeter road. An elliptical pit that may contain dark material or liquid is present in this area. Unidentifiable objects are scattered east of the pit. An irregular pit, possibly containing liquid, is present northeast of this barren area. The old fill area in the eastern end of the site is now revegetating. The vehicle trail leading north from the fill area remains visible; however, the scarred area at its terminus is also revegetating. North of the Ranges Near Training Area T-24A, a large dogleg shaped area has been denuded of all trees and now has a low vegetation cover. This area is roughly bounded by the developed roadway to the west, a new vehicle trail to the east, and the perimeter road to the south. A large rectangular structure, possibly a building, has been constructed in the southwest corner of the denuded area. A white, "L"-shaped appendage (possibly an earthen berm) is present off the east side of this structure. A drainage channel is visible east of the structure.

Two scarred areas, possibly excavations, are noted north of the large structure. Linear ground scars, possibly associated with the graded area to the south, are visible east of the structure. Drainage flow is interrupted and altered by a barren and disrupted site, possibly a fill area, on the west side of the denuded area. A new road from the original access roadway accesses this site.

A bridge carries the road over the drainage bed immediately south of the barren, disrupted area. A crater-like depression is present near the center of the large denuded area. A curved escarpment is noted north of the depression. The low area north of the escarpment face is light in tone. A smoothly graded, possible fill site is present in the northern end of the denuded area and is contiguous with the bordering roadway. A vehicle trail emanates from the eastern side of this site. An excavation is noted at the left side of the photo, along the south side of the access road. A vehicle trail leads eastward from the opposite side of the access road to a small ground scar.

January 8, 1972, Figure 1-8. The Ranges Near Training Area T-24A and the external areas retain their basic 1969 configuration. Access into the area is unchanged. The perimeter road around the site is again delineated for clarity. The western section of the Ranges Near Training Area T-24A appears to be falling into disuse. The crescent-shaped scar here continues to erode and is edged with vegetation. The structure adjacent to the escarpment in 1969 is gone. More vegetation covers the ground and assorted mounds south of the escarpment. The small structure remains in the southern end of this area. The probable small fill area west of the escarpment is also revegetating; the adjacent drainage ditch remains visible. The cleared area at the central section of the site is now covered with shrubs and small trees. The graded area to the north of this is unchanged. The fence has been removed from the barren elevation to the east. The surface here remains scarred. The large depression seen here in 1969 lies partially obscured at the center of the area. A semicircle of small objects is present on the approximate location of a previous (1969) depression. The surface here is now level and dark in tone. A larger semicircle of objects stands near the southern corner of this area. A possible ground stain is noted northeast of this second group. Rows of small mounds are present along the northeastern and southwestern sides of the elevation; the former are larger and more distinct. Small objects or possible debris (not annotated) are present southeast of this group, while a small earthen berm is noted to its northwest.

A second pit has been added in the light-toned, barren area, located northwest of the elevation across the Ranges Near Training Area T-24A perimeter road. Indistinct material (not annotated) is present around the eastern end of this area. The irregular, possibly liquid-filled pit remains to the northeast.

Shrub vegetation now covers portions of the large, previously denuded area north of the Ranges Near Training Area T-24A. Limited development of this area continues. The large structure remains in the southwest corner of the denuded area. The eastern end of the structure has been

enlarged, and a small extension projects from its north side. The possible berm remains off the east side. A smaller structure (not annotated), possibly a shed, stands to the east. The two possible excavations north of the large structure have revegetated. Indistinct mounded material is present at the smaller, northern excavation.

The linear ground scars east of the large structure are also revegetating. A new road spur, possibly a prelude to future construction, leads to the creek bed east of the scars. Drainage patterns through the denuded area appear static. The barren area associated with altered drainage flow at the west side of the area remains disrupted. New ground scarring is visible across its eastern surface, and a mounded dark feature is present in the west. Access to this area is unchanged.

The small depression and escarpment near the center of the denuded area are unchanged. The graded possible fill site to the north now has a partial low vegetation cover, which gives the surface a mottled appearance. Possible mounded material is present on the southeast extension of this site. A vehicle trail leads eastward from the site to a barren and scarred hilltop area. The excavation remains west of the denuded area, along the original access road. A possibly vegetated hilltop clearing is noted to the north of this. The use of this clearing is unknown.

1.5 Regional and Site-Specific Geology

Calhoun County includes parts of two physiographic provinces, the Piedmont Upland Province and the Valley and Ridge Province. The Piedmont Upland Province occupies the extreme eastern and southeastern portions of the county and is characterized by metamorphosed sedimentary rocks. The generally accepted range in age of these metamorphics is Cambrian to Devonian.

The majority of Calhoun County, including the Main Post of FTMC, lies within the Appalachian fold and thrust structural belt (Valley and Ridge Province) where southeastward-dipping thrust faults with associated minor folding are the predominant structural features. The fold and thrust belt consists of Paleozoic sedimentary rocks that have been asymmetrically folded and thrust-faulted with major structures and faults striking in a northeast-southwest direction. Northwestward transport of the Paleozoic rock sequence along the thrust faults has resulted in the imbricate stacking of large slabs of rock referred to as thrust sheets. Within an individual thrust

sheet, smaller faults may splay off the larger thrust fault, resulting in imbricate stacking of rock units within an individual thrust sheet (Osborne and Szabo, 1984). Geologic contacts in this region generally strike parallel to the faults and repetition of lithologic units is common in vertical sequences. Geologic formations within the Valley and Ridge Province portion of Calhoun County have been mapped by Warman and Causey (1962), Osborne and Szabo (1984), and Moser and DeJarnette (1992), and vary in age from Lower Cambrian to Pennsylvanian.

The basal unit of the sedimentary sequence in Calhoun County is the Cambrian Chilhowee Group. The Chilhowee Group is comprised of the Cochran, Nichols, Wilson Ridge, and Weisner Formations (Osborne and Szabo, 1984), but in Calhoun County is either undifferentiated or divided into the Cochran and Nichols Formations and an upper undifferentiated Wilson Ridge and Weisner Formation. The Cochran is composed of poorly sorted arkosic sandstone and conglomerate with interbeds of greenish-grey siltstone and mudstone. Massive to laminated, greenish-grey and black mudstone makes up the Nichols Formation with thin interbeds of siltstone and very fine-grained sandstone (Szabo et al., 1988). These two formations are mapped only in the eastern part of the county.

The Wilson Ridge and Weisner Formations are undifferentiated in Calhoun County and consist of both coarse-grained and fine-grained clastics. The undifferentiated unit is comprised of coarse-grained and fine-grained units. The coarse-grained facies appear to dominate the unit and consists primarily of coarse-grained, vitreous quartzite, and friable, fine- to coarse-grained, orthoquartzitic sandstone, both of which locally contain conglomerate. The fine-grained facies consists of sandy and micaceous shale and silty, micaceous mudstone which are locally interbedded with the coarse clastic rocks. The abundance of orthoquartzitic sandstone and quartzite suggests that most of the Chilhowee Group bedrock in the vicinity of FTMC belongs to the Weisner Formation (Osborne and Szabo, 1984).

The Cambrian Shady Dolomite overlies the Weisner Formation northeast, east and southwest of the Main Post and consists of interlayered bluish-grey or pale yellowish-grey sandy dolomitic limestone and siliceous dolomite with coarsely crystalline porous chert (Osborne et al., 1989). A variegated shale and clayey silt have been included within the lower part of the Shady Dolomite (Cloud, 1966). Material similar to this lower shale unit was noted in core holes drilled by the Alabama Geologic Survey on FTMC (Osborne and Szabo, 1984). The character of the Shady Dolomite in the FTMC vicinity and the true assignment of the shale at this stratigraphic interval are still uncertain (Osborne 1999, personal communication).

The Rome Formation overlies the Shady Dolomite and locally occurs to the northwest and southwest of the Main Post as mapped by Warman and Causey (1962) and Osborne and Szabo (1984). The Rome Formation consists of variegated thinly interbedded greyish-red-purple mudstone, shale, siltstone, and greenish-red and light grey sandstone, with locally occurring limestone and dolomite. The Conasauga Formation overlies the Rome Formation and occurs along anticlinal axes in the northeastern portion of Pelham Range (Warman and Causey, 1962), (Osborne and Szabo, 1984) and the northern portion of the Main Post (Osborne et al., 1997). The Conasauga Formation is composed of dark-grey, finely to coarsely crystalline medium- to thick-bedded dolomite with minor shale and chert (Osborne et al., 1989).

Overlying the Conasauga Formation is the Knox Group, which is composed of the Copper Ridge and Chepultepec dolomites of Cambro-Ordovician age. The Knox Group is undifferentiated in Calhoun County and consists of light medium grey, fine to medium crystalline, variably bedded to laminated, siliceous dolomite and dolomitic limestone that weathers to a chert residuum (Osborne and Szabo, 1984). The Knox Group underlies a large portion of the Pelham Range area.

The Ordovician Newala and Little Oak Limestones overlie the Knox Group. The Newala Limestone consists of light to dark grey, micritic, thick-bedded limestone with minor dolomite. The Little Oak Limestone is comprised of dark grey, medium- to thick-bedded, fossiliferous, argillaceous to silty limestone with chert nodules. These limestone units are mapped together as undifferentiated at FTMC and other parts of Calhoun County. The Athens Shale overlies the Ordovician limestone units. The Athens Shale consists of dark-grey to black shale and graptolitic shale with localized interbedded dark grey limestone (Osborne et al., 1989). These units occur within an eroded "window" in the uppermost structural thrust sheet at FTMC and underlie much of the developed area of the Main Post.

Other Ordovician-aged bedrock units mapped in Calhoun County include the Greensport Formation, Colvin Mountain Sandstone, and Sequatchie Formation. These units consist of various siltstones, sandstones, shales, dolomites and limestones, and are mapped as one, undifferentiated unit in some areas of Calhoun County. The only Silurian-age sedimentary formation mapped in Calhoun County is the Red Mountain Formation. This unit consists of interbedded red sandstone, siltstone, and shale with greenish-grey to red silty and sandy limestone.

The Devonian Frog Mountain Sandstone consists of sandstone and quartzitic sandstone with shale interbeds, dolomudstone, and glauconitic limestone (Szabo et al., 1988). This unit locally occurs in the western portion of Pelham Range.

The Mississippian Fort Payne Chert and the Maury Formation overlie the Frog Mountain Sandstone and are composed of dark- to light-grey limestone with abundant chert nodules and greenish-grey to greyish-red phosphatic shale with increasing amounts of calcareous chert toward the upper portion of the formation (Osborne and Szabo, 1984). These units occur in the northwestern portion of Pelham Range. Overlying the Fort Payne Chert is the Floyd Shale, also of Mississippian Age, which consists of thin-bedded, fissile brown to black shale with thin intercalated limestone layers and interbedded sandstone. Osborne and Szabo (1984) reassigned the Floyd Shale, which was mapped by Warman and Causey (1962) on the Main Post of FTMC, to the Ordovician Athens Shale on the basis of fossil data.

The Jacksonville Thrust Fault is the most significant structural geologic feature in the vicinity of FTMC, both for its role in determining the stratigraphic relationships in the area and for its contribution to regional water supplies. The trace of the fault extends northeastward for approximately 39 miles between Bynum, Alabama and Piedmont, Alabama. The fault is interpreted as a major splay of the Pell City Fault (Osborne and Szabo, 1984). The Ordovician sequence comprising the Eden thrust sheet is exposed at FTMC through an eroded "window" or "fenster" in the overlying thrust sheet. Rocks within the window display complex folding with the folds being overturned, and tight to isoclinal. The carbonates and shales locally exhibit well-developed cleavage (Osborne and Szabo, 1984). The FTMC window is framed on the northwest by the Rome Formation, north by the Conasauga Formation, northeast, east, and southwest by the Shady Dolomite, and southeast and southwest by the Chilhowee Group (Osborne et al., 1997).

A north-south trending fault trace was mapped by Osborne (1999) to the west of Parcel 187(7) (Figure 1-9). This fault is mapped within the Chilhowee Group, undifferentiated, and appears to be a splay of the Jacksonville Fault mapped approximately 2,000 feet northwest of Parcel 187(7). During site reconnaissance by IT, the only visual evidence supporting the presence of the fault was observed in an outcrop of deformed shale and siltstone beds along the north-south trending creek to the west of Parcel 187(7).

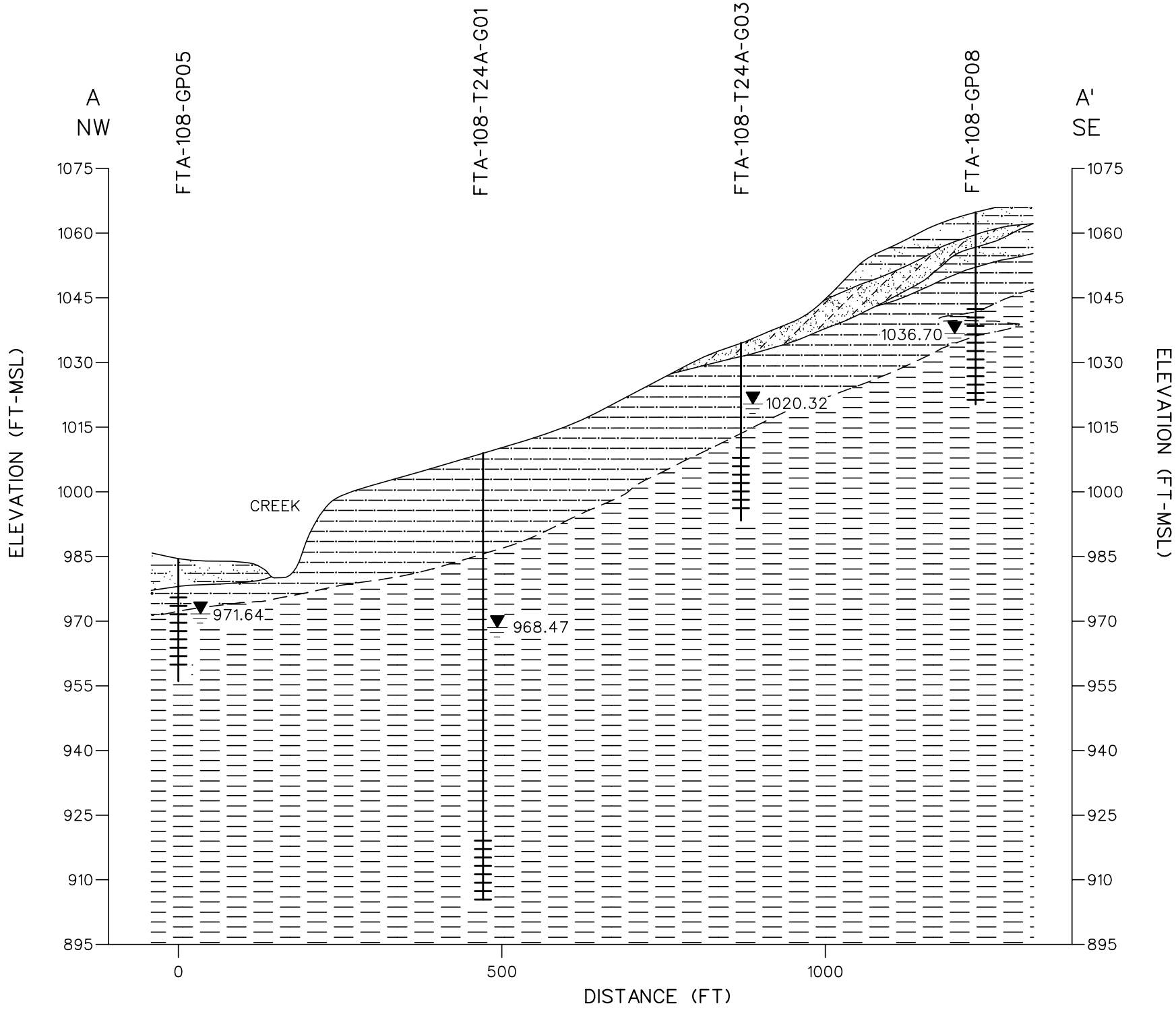
The geology in the vicinity of Ranges Near Training Area T-24A was assessed using lithologic logs prepared by Science Applications International Corporation (SAIC) during the supplemental

RI monitoring well installation program and lithologic logs prepared by IT during the SI activities at Parcels 88(6) and 108(7). Lithologic logs are included in Appendix A. A geologic cross section using the lithologic data from the previous investigations is shown in Figure 1-10. The cross section shows that, in general, the sediments at the Ranges Near Training Area T-24A site consist of brown sandy silt to silt, with interbedded red sandy clay. The silt grades to light-grey to yellowish-brown weathered shale. The shale grades to grey with depth. The silt and clay are present at higher elevations to the southeast of Ranges Near Training Area T-24A, pinching out at lower elevations. However, pale-brown to tan shale and siltstone were observed in the north-south trending stream channel west of Parcel 187(7). Bedrock and residuum are apparently associated with the Chilhowee Group, undifferentiated as mapped by Osborne and Szabo (1997) (Figure 1-9). Detailed site-specific geology of Ranges Near Training Area T-24A will be documented during the proposed supplemental RI activities.

1.6 Regional and Site-Specific Hydrogeology

A hydrogeologic assessment of regional groundwater flow patterns to determine the approximate groundwater flow directions with respect to the various geologic units, surface water bodies, and known subsurface conduit (thrust fault) features in the area surrounding FTMC and Pelham Range has not been conducted. Aquifers in the vicinity of FTMC and Pelham Range are developed in residuum derived from bedrock decomposition; within fractured bedrock; along fault zones; and from the development of karst frameworks. Although detailed characterizations of groundwater movement in the region have not been conducted, the ultimate movement of groundwater may be estimated to be toward major surface water features. However, because of the impacts of differential weathering, variable fracturing, and the potential for conduit flow development, the use of surface topography as an indicator for groundwater flow direction in the area must be used with caution. Areas with well-developed residuum horizons may subtly reflect the surface topography, but the groundwater flow direction also may exhibit the influence of pre-existing structural fabrics or the presence of perched water horizons on unweathered ledges or boulders (SAIC, 1998).

Precipitation in the form of rain is the source of most groundwater recharge in Calhoun County. The thrust fault zones typical of the county form large storage reservoirs for groundwater. Precipitation and subsequent infiltration provide recharge to the groundwater flow system. Points of discharge occur as springs, effluent streams, and lakes. Shallow groundwater on FTMC occurs principally in the residuum developed from Cambrian sedimentary and carbonate bedrock units of the Weisner Formation and locally in lower Ordovician carbonates. Bedrock

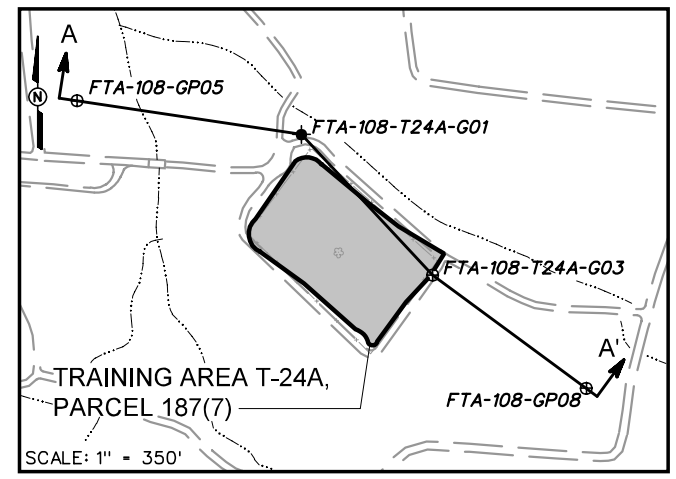


LEGEND

- SCREEN INTERVAL
- WATER TABLE (3/14/00)
- 971.64 GROUNDWATER ELEVATION (FT MSL)
- SAND-SOME SILT
- SAND-SOME CLAY
- SILT
- WEATHERED SHALE

NOTE:

1. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.



CROSS SECTION LOCATION

FIGURE 1-10
GEOLOGIC CROSS SECTION A-A'
RANGES NEAR TRAINING
AREA T-24A
PARCELS 187(7), 112Q, 113Q-X, 213Q
AND 214Q

HORIZONTAL
0 200 400 FEET

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
A Member of The IT Group

DRAFT. CHCK. BY:
ENGR. CHCK. BY: J. JENKINS
INITIATOR: D. LAMB
PROJ. MGR.: J. YACOUB
DWG. NO.: ...\796887es.067
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DATE LAST REV.:
DRAWN BY:
STARTING DATE: 04/17/00
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permeability may be locally enhanced by fracture zones associated with thrust faults and by the development of solution (karst) features (predominantly on Pelham Range).

Groundwater elevations in the vicinity of Ranges Near Training Area T-24A were calculated by measuring depths to groundwater on March 14, 2000, relative to the top-of-casing elevations in each of the 18 monitoring wells associated with Parcels 88(6) and 108(7). A groundwater elevation map using the calculated groundwater elevations is shown on Figure 1-11. The groundwater elevation of FTA-108-T24A-G01 was not used because this well is screened much deeper than other wells in the area, and likely represents a deeper groundwater zone. Based on groundwater elevation data in the 18 wells, groundwater flow across the site is to the northwest with a hydraulic gradient of 0.094 feet per foot, generally following the slope of the ground surface. The hydraulic conductivity of the screened formation of monitoring well T24A-G03 (subsequently renamed FTA-108-T24A-G03) was calculated to be 3.04 E-04 centimeters per second (SAIC, 1995). This value falls within an established range of hydraulic conductivity for silt and sandstone as reported by Freeze and Cherry (1979).

Based on its location, the splay fault mapped west of Ranges Near Training Area T-24A is suspected to deflect regional groundwater movement to the north following the general strike of the fault. A review of the lithologic log of monitoring well T24A-G01 (Appendix A, subsequently renamed FTA-108-T24A-G01) reveals that the well was completed in a groundwater-bearing fractured zone within the shale. This reported fractured zone may be the subsurface expression of the splay fault; however, because subsurface structural data were not collected at the time the well was installed, the presence of a fault at this location has not been defined. Furthermore, the potential influence of the splay fault on groundwater movement in the vicinity of the Ranges Near Training Area T-24A is unknown.

1.7 Scope of Work

The scope of work for activities associated with the supplemental RI for the Ranges Near Training Area T-24A site includes the following tasks:

- Develop the supplemental RI SFSP attachment.
- Develop the supplemental RI SSHP attachment.
- Develop the site-specific UXO safety plan attachment.

- Conduct a surface and near surface UXO survey over all areas to be included in the sampling effort.

- Provide downhole UXO support for all intrusive drilling activity to determine the presence of potential downhole hazards.

- Install 19 groundwater monitoring wells (9 residuum and 10 bedrock wells).

- Collect 29 surface soil samples, 8 subsurface soil samples, 37 groundwater samples (collected from 18 existing and 19 proposed monitoring wells), 7 surface water samples and 7 sediment samples.

- Samples will be analyzed for the parameters listed in Section 4.5.

The possibility of UXO exists at the Ranges Near Training Area T-24A; therefore, UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at the Ranges Near Training Area T-24A. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance.

At completion of the field activities and sample analyses, draft and final supplemental RI summary reports will be prepared. Reports will be prepared in accordance with current EPA Region IV and Alabama Department of Environmental Management (ADEM) requirements.

2.0 Summary of Existing Environmental Studies

An environmental baseline survey (EBS) was conducted to document current environmental conditions of all FTMC property (ESE, 1998). The study identified sites that, based on available information, have no history of contamination and comply with U.S. Department of Defense (DOD) guidance on fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by seven criteria.

1. Areas where no storage, release, or disposal (including migration) has occurred
2. Areas where only release or disposal of petroleum products has occurred
3. Areas of contamination below action levels
4. Areas where all necessary remedial actions have been taken
5. Areas of known contamination with removal and/or remedial action underway
6. Areas of known contamination where required response actions have not been taken
7. Areas that are not evaluated or require further evaluation.

The EBS was conducted in accordance with the Community Environmental Response Facilitation Act (CERFA) (CERFA-Public Law 102-426) protocols and DOD policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, ADEM, EPA Region IV, and Calhoun County, as well as a database search of Comprehensive Environmental Response, Compensation, and Liability Act-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historic maps and aerial photographs were reviewed to document historic land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

The Former Chemical Munitions Disposal Area, Parcel 187(7) is identified as a CERFA Category 7 site: areas that are not evaluated or require further evaluation. This CERFA site is a parcel where smoke munitions, fog oil, and other petroleum products were stored, and possibly released onto the site or to the environment, and/or were disposed on site property. Training

activities conducted here reportedly included disposal of chemical warfare materials (CWM) munitions filled with CG, BZ, GB, and HD. The decontaminants STB and DS2 were also used here.

The two square burning pits were repeatedly used in chemical munitions disposal training. Each pit's depth has been assumed to be 6 feet based on standard operating procedures (Roy R. Weston, Inc. [Weston], 1990). Personnel interviewed during the EBS site visit recall the pits measuring approximately 12 feet across and 4 feet deep. Within the pits, military personnel reportedly burned dunnage and then used a shaped charge to blow chemical warfare agent (CWA) from the munition into the fire to destroy the CWA (Toole, 1996). GB was the CWA cited by Mr. Toole as being used during these exercises. After each training exercise, the area was sprayed with STB (ESE, 1984).

Each pit was reportedly filled with soil at closure in 1973. During the closure, soil samples were collected from 3 to 10 centimeters depth (April and July 1973), and results were negative for CWMs in question. However, the depths may not have represented the depths at which the CWM could still be present (ESE, 1984).

This area may have experienced a large HD spill, according to Weston (Weston, 1990). Investigations during the RI unearthed two fuzed 105 millimeter howitzer rounds, one 155 millimeter howitzer round, four 4.2-inch mortar rounds, and a burster tube located west of a concrete monument. CWM was not present in any of these ordnance items (SAIC, 1995). Geophysical surveys during the RI identified the potential former training pits (Figure 2-1). Numerous smaller anomalies were also identified. Buried ordnance was also identified within the fenced enclosure. Anomalies indicated metallic material buried between 0 and 15 feet-below ground surface (bgs).

An unauthorized dump was reported at western edge of the fence. Materials reportedly disposed of include drums, metal poles, lights, an automobile, and wood. This area requires further evaluation.

Parcel 187(7) lacks adequate documentation and therefore requires additional evaluation to determine the environmental condition of the parcel.

The Former Machine Gun Range, Parcel 112Q, Former Demolition Area, Parcel 113Q-X, Former Bandholtz Machine Gun Qualifying Range, Parcel 213Q, and Former Bandholtz Field

Firing Range, Parcel 214Q are identified as CERFA Category 1 sites: areas where no storage, release, or disposal (including migration) has occurred. The environmental or safety concern at these sites is the potential occurrence of lead in environmental media from the use of firearms.

2.1 Site Investigation, Former Chemical Munitions Disposal Area, Parcel 187(7)

During an SI of the Former Chemical Munitions Disposal Area, Parcel 187(7) in 1992, a surface water sample and a sediment sample (T24A-D01/T24A-W01) were collected by U.S. Army Technical Escort Unit from the tributary of South Branch Cane Creek, downgradient of the Former Chemical Munitions Disposal Area (Figure 2-1). The samples were analyzed for HD and GB breakdown products. The sample results did not show the presence of chemical CWM breakdown products (Table 2-1) (SAIC, 1993).

2.2 Remedial Investigation, Former Chemical Munitions Disposal Area, Parcel 187(7)

In 1994, a surface water sample and a sediment sample (T24A-W02/T24A-D02) were again collected from the tributary of South Branch Cane Creek, downgradient of the Former Chemical Munitions Disposal Area (Figure 2-1). These samples were collected as part of a RI of the former Chemical Munitions Disposal Area (SAIC, 1995). These samples were analyzed for volatile organic compounds (VOC), semivolatile organic compounds (SVOC), explosives, metals, and HD and GB CWM breakdown products. The analytical data for these samples did not show the presence of CWM breakdown products. The complete list of analytical results for these samples is contained in Appendix B of this SFSP. The sample results for the surface water sample (T24A-W02) contained trace metals. Low-level metals, including lead and arsenic, and benzyl alcohol (a typical laboratory contaminant), were detected in the sediment sample. These samples did not contain any CWM breakdown products or other organic compounds. A summary of the detected analytes from the analyses of these samples is presented in Table 2-2.

Screening and analysis of soil sample data from within the former Chemical Munitions Disposal Area, Parcel 187(7) during the 1992 SI and the 1994 RI did not detect any chemical agents or CWM breakdown products (SAIC, 1995).

Four monitoring wells were installed around the former Chemical Munitions Disposal Area (Area T24A), Parcel 187(7) (Figure 2-1) in 1994 as part of the RI (SAIC, 1995). Two rounds of groundwater samples were collected from the wells in 1994 and 1995. The groundwater samples were analyzed for VOCs, SVOCs, pesticides/polychlorinated biphenyls (PCB), explosives,

Table 2-1

Surface Water and Sediment Sample Data[a]
1992 Site Investigation Results
Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Analysis for Chemical Agent Breakdown Products

Site ID		T24A-W01		T24A-D01
Site Type		Creek		Creek
Sample Matrix		Water		Sediment
Collection Date		04/24/1992		04/24/1992
Parameters	**Units**			
Method UT02				
Isopropylmethyl phosphonic acid	µg/L	ND(100)	µg/g	ND(2.10)
Methyl phoshonic acid	µg/L	ND(128)	µg/g	ND(2.0)
Method UL04				
1,4-Oxathiane	µg/L	ND(1.98)	µg/g	ND(0.856)
1,4-Dithiane	µg/L	ND(1.11)	µg/g	ND(1.47)
p-Chlorophenylmethylsulfoxide	µg/L	ND(4.23)	µg/g	ND(2.25)
p-Chlorophenylmethylsulfone	µg/L	ND(4.72)	µg/g	ND(2.37)
Method UW22				
Thiodiglycol	µg/L	ND(48.8)	µg/g	ND(3.94)
Method T8				
Diisopropylmethylphosphonate	µg/L	ND(10.5)	µg/g	ND(0.114)
Dimethylmethylphosphonate	µg/L	ND(15.2)	µg/g	ND(0.133)

[a] Science Applications International Corporation (SAIC) 1993, *Site Investigation Report, Fort McClellan, Alabama* , August.

µg/L - Micrograms per liter.
µg/g - Micrograms per gram.
ND - Analyte not detected at the reporting limit in parenthesis (X).

Table 2-2

Summary of Detected Analytes for Surface Water and Sediment Sample Data[a]
1994 Remedial Investigation Results
Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Site ID		T24A-W02		T24A-D02
Field Sample Number		SAIC01		SAIC01
Site Type		Creek		Creek
Sample Matrix		Water		Sediment
Collection Date		06/23/1994		06/19/1994
Parameters	**Units**			
Arsenic	µg/L	ND(2.35)	µg/g	5.38
Lead	µg/L	8.82	µg/g	11.6
Aluminum	µg/L	209	µg/g	9810
Barium	µg/L	23.5	µg/g	130
Beryllium	µg/L	1.12	µg/g	0.825
Calcium	µg/L	1900	µg/g	8140
Cobalt	µg/L	ND(16.8)	µg/g	3.77
Chromium	µg/L	ND(25)	µg/g	27
Copper	µg/L	18.8	µg/g	12.1
Iron	µg/L	409	µg/g	50,400
Potassium	µg/L	1890	µg/g	1720
Magnesium	µg/L	1110	µg/g	4950
Manganese	µg/L	19.5	µg/g	521
Sodium	µg/L	1100	µg/g	ND(38.7)
Nickel	µg/L	ND(32.1)	µg/g	6.25
Vanadium	µg/L	ND(27.6)	µg/g	31.8
Zinc	µg/L	ND(18)	µg/g	20.2
Benzyl Alcohol	µg/L	ND(4)	µg/g	0.062

[a]Science Applications International Corporation (SAIC) 1995, *Remedial Investigation Report, Fort McClellan Alabama* , August.

µg/L - micrograms per liter. ND - Analyte not detected at the reporting limit in parenthesis (X).

µg/g - Micrograms per gram. N/A - not analyzed.

metals, and HD, GB, and nerve agent (O-ethyl-S-[diisoproplaminoethyl]-methylphosphnothiolate) breakdown products. Well T24A-G01 (redesignated FTA-108-T24A-G01 during the subsequent SI at Parcel 108[7]) contained concentrations of benzene (100 to 200 micrograms per liter [µg/L]), phenol (57 µg/L, alpha-betahexachlorocyclohexane (BHC) (0.00424 µg/L), and pentachlorophenol (1.3 to 2 µg/L). Concentrations of trace metals and trace pesticides (alpha-BHC, isodrin, lindane, 4,4'-dichlorodiphenyldichloroethene) and the explosive 1,3,5-trinitrobenzene were reported in the groundwater samples; however, confirmation analysis did not confirm the trace concentrations of organics and the values were regarded as non-detected analytes (SAIC, 1995). There were no chemical agents or their breakdown products detected in the monitoring well samples. A summary of the detected analytes from the analyses of these samples is presented in Table 2-3.

2.3 Site Investigation, Range 24A Fog Oil Drum Storage Area Parcel 88(6) and Range 24A Multipurpose Range Parcel 108(7)

IT conducted separate and concurrent SIs at the Range 24A Fog Oil Drum Storage Area, Parcel 88(6), and Range 24A Multipurpose Range, Parcel 108(7) during fall 1999. The area encompassing these parcels overlaps the area of the Ranges Near Training Area T-24A. The SIs were performed under the Baseline Realignment and Closure (BRAC) Environmental Restoration Program. Four surface soil, four subsurface soil, two depositional soil, and four groundwater samples were collected as part of the SI at Parcel 88(6), and four residuum groundwater monitoring wells were installed in conjunction with the SI. Ten surface soil, ten subsurface soil, three depositional soil, fourteen groundwater, three surface water, and three sediment samples were collected as part of the SI at Parcel 108(7), and ten groundwater monitoring wells were installed in conjunction with the SI at Parcel 108(7). Of the 14 groundwater samples collected at Parcel 108(7) in 1999, four samples were collected from existing wells installed by SAIC in 1994 during the RI for the Former Chemical Munitions Disposal Area Parcel 187(7). For the SIs at Parcels 88(6) and 108(7), the existing monitoring wells were designated as follows:

- T24A-G01 redesignated as FTA-108-T24A-G01
- T24A-G02 redesignated as FTA-108-T24A-G02
- T24A-G03 redesignated as FTA-108-T24A-G03
- BK-G06 redesignated as FTA-108-BK-G06.

Sample locations of the Parcel 88(6) and Parcel 108(7) SIs are shown on Figure 2-2.

Table 2-3

Summary of Detected Analytes for Monitor Wells Sample Data[a]
1994 Remedial Investigation Results
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Site ID (Monitor Well Number)		T24A-G01	T24A-G01	T24A-G01	T24A-G02	T24A-G02	T24A-G03	T24A-G03	BK-G06	BK-G06
Field Sample Number		SAIC01	SAIC03	SAIC04	SAIC03	SAIC04	SAIC01	SAIC03	SAIC01	SAIC03
Laboratory Sample Number		UB06049	UC00382	UC00383	UC00384	UC00899	UB06050	UC00385	UB04884	UC00386
Site Type		Well	Well	Well	Well	Well	Well	Well	Well	Well
Sample Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Collection Date		10/23/1994	02/01/1995	02/01/1995	02/02/1995	04/24/1995	10/23/1994	02/01/1995	07/15/1994	02/02/1995
Depth (Feet)		50	50.39	50.39	23.47	28.3	18.5	12.8	17.5	14.5
QC Sample Type		Original	Original	Duplicate	Original	Original	Original	Original	Original	Original
Associated Sample Number		N/A	SAIC04	SAIC03	N/A	N/A	N/A	N/A	N/A	N/A
Parameters	**Units**									
Lead	µg/L	5.05	ND(4.47)	12.2	ND(4.47)	ND(4.47)	ND(4.47)	ND(4.47)	ND(4.47)	ND(4.47)
Selenium	µg/L	ND(2.53)	5	3.57	ND(2.53)	ND(2.53)	ND(2.53)	ND(2.53)	ND(2.53)	ND(2.53)
Thallium	µg/L	10.5	3.69	3.37	ND(2.44)	ND(10)	ND(2.44)	ND(2.44)	4.2	ND(2.44)
Aluminum	µg/L	4190	158	155	217	1890	2080	1220	5450	1010
Barium	µg/L	114	66	62.2	8.85	25.6	68	40.9	53.1	26.8
Beryllium	µg/L	1.49	ND(1.12)	1.63	ND(1.12)	ND(1.12)	ND(1.12)	ND(1.12)	ND(1.12)	ND(1.12)
Calcium	µg/L	8110	21,200	19,900	1610	1450	776	822	234	217
Iron	µg/L	23,300	9,410	9180	8650	9850	10,600	10,200	25,800	3,560
Potassium	µg/L	3880	8980	8850	1640	1670	ND(1240)	ND(1240)	6280	3230
Magnesium	µg/L	11,700	10,400	10,000	17,900	15,800	7,200	7,190	435	176
Manganese	µg/L	1550	1130	1100	1690	1530	762	771	59.3	21.7
Sodium	µg/L	1860	3380	3200	2030	3220	1150	1280	1370	1150
Zinc	µg/L	76.3	ND(18)	ND(18)	ND(18)	ND(18)	21.9	22.5	25.9	18
Benzene	µg/L	100	200	200	ND(1)	N/A	ND(1)	ND(1)	ND(1)	ND(1)
bis(2-Ethylhexyl)phthalate	µg/L	19	12	ND(7.7)	ND(7.7)	ND(7.7)	ND(7.7)	14	ND(7.7)	ND(7.7)
Phenol	µg/L	57	ND(2.2)	ND(2.2)	ND(2.2)	ND(2.2)	ND(2.2)	ND(2.2)	ND(2.2)	ND(2.2)
Pentachlorophenol	µg/L	2	ND(1)	ND(1)	ND(1)	ND(1)	1.3	ND(1)	ND(1)	ND(1)
alpha-BHC	µg/L	0.00424	ND(0.0025)	ND(0.0025)	ND(0.0025)	ND(0.0025)	ND(0.0025)	ND(0.0025)	ND(0.0025)	ND(0.0025)
Isodrin	µg/L	0.0127 U	ND(0.0025)	0.00411 UB	0.00455 UB	0.00317 UB	0.0333 U	0.00358 UB	ND(0.0025)	0.00467 UB
Lindane	µg/L	0.00432 Q	ND(0.0025)	ND(0.0025)	ND(0.0025)	ND(0.0025)	ND(0.0025)	ND(0.0025)	ND(0.0025)	ND(0.0025)
4,4'-DDE	µg/L	ND(0.0039)	0.0138 U	0.0122 U	ND(0.0039)	ND(0.0039)	ND(0.0039)	0.00982 U	ND(0.0039)	ND(0.0039)
1,3,5-Trinitrobenzene	µg/L	0.446 U	ND(0.21)	ND(0.21)	0.474 UB	ND(0.21)	0.287 U	0.511 UB	ND(0.21)	ND(0.21)

[a]Science Applications International Corporation (SAIC) 1995, *Remedial Investigation Report, Fort McClellan, Alabama,* August

µg/L - Micrograms per liter.
ND - Not detected at the reporting limit in the parenthesis (X).
N/A - Analysis not performed or item is not applicable.
U - Analysis is unconfirmed with second column analysis.
B - Analyte also found in the method blank sample or QC blank sample.
Q - Sample interference obscured peak of interest.

The analytical results were compared to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background values for FTMC. The SSSLs and ESVs were developed by IT as part of the human health and ecological risk evaluations associated with SIs being performed under the BRAC Environmental Restoration Program at FTMC. The SSSLs and ESVs are presented in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000b). Background metals screening values are presented in the background metals survey report (SAIC, 1998). Analytical results of these investigations are summarized in Tables 2-4 through 2-13.

The results of the chemical analyses of samples collected at the Range 24A, Parcels 88(6) and 108(7) indicate that metals, VOCs, SVOCs, and pesticides have been detected in the various site media. To evaluate whether the detected constituents present an unacceptable risk to human health and the environment, detected constituent concentrations were compared to the human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluations as part of the ongoing SIs being performed under the BRAC Environmental Restoration Program at FTMC.

Metal concentrations exceeding the SSSLs and ESVs were subsequently compared to background metals screening values (background concentrations) (SAIC, 1998) to determine whether the metals concentrations are within natural background concentrations.

Six compounds were quantified by both SW-846 Method 8260B (as VOC) and Method 8270C (as SVOC), including 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, 1,3-dichlorobenzene, 1,2-dichlorobenzene, hexachlorobutadiene, and naphthalene. Method 8260B yields a reporting limit (RL) of 0.005 milligrams per kilogram (mg/kg), while Method 8270C has a RL of 0.330 mg/kg, which is typical for a soil matrix sample. Due to the direct nature of the Method 8260B analysis and its resulting lower RL, this method is deemed superior to Method 8270C when quantifying low levels (0.005 to 0.330 mg/kg) of these compounds. Method 8270C and its associated methylene chloride extraction step is superior, however when quantifying samples that contain higher concentrations (greater than 0.330 mg/kg) of these compounds. Therefore all data were considered and none were categorically excluded. Data validation qualifiers were used in evaluating the usability of data, primarily where calibration, blank contamination, precision, or accuracy indicator anomalies were encountered. The validation qualifiers and concentrations reported (e.g., whether concentrations were less than or greater than 0.330 mg/kg) were used to

Table 2-4

Surface and Depositional Soil Analytical Results
Range 24A Fog Oil Drum Storage, Parcel 88(6)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Parcel			Site [b]	Ecological [b]	FTA-88-DEP01					FTA-88-DEP02					FTA-88-GP01				
Sample Location			Specific	Screening	FTA-88					FTA-88					FTA-88				
Sample Number			Screening	Values	FR0011					FR0012					FR0001				
Sample Date			Levels		05-Mar-99					29-Sep-99					30-Oct-98				
Sample Depth (Feet)					0- 1					0- .25					0- 1				
Parameter	Units	BKG [a]	SSSL	ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	5.57E+03				YES	9.89E+03			YES	YES	7.18E+03				YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	4.50E+00			YES		3.10E+00			YES		1.02E+01			YES	YES
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	4.06E+01					4.55E+01					3.83E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	3.60E-01	J				4.40E-01	J				ND				
Calcium	mg/kg	1.72E+03			4.27E+02	J				4.34E+02	J				1.19E+03				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.59E+01				YES	1.01E+01				YES	1.09E+02		YES	YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	4.30E+00	J				4.30E+00	J				ND				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	6.10E+00					6.50E+00					1.33E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.34E+04			YES	YES	1.35E+04			YES	YES	8.15E+04		YES	YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.79E+01					2.47E+01					3.00E+01				
Magnesium	mg/kg	1.03E+03		4.40E+05	1.60E+02	J				3.48E+02	J				ND				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	3.22E+02				YES	2.61E+02				YES	2.47E+02				YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	5.80E-02					7.10E-02	B				ND				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	3.10E+00	J				4.00E+00	J				1.09E+01		YES		
Potassium	mg/kg	8.00E+02			1.66E+02	J				2.26E+02	J				ND				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	6.30E-01		YES			5.60E-01	J	YES			1.20E+00		YES		YES
Sodium	mg/kg	6.34E+02			8.91E+01	B				4.92E+01	B				ND				
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	5.50E-01	B		YES		8.00E-01	B		YES		ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	1.77E+01				YES	1.86E+01				YES	ND				
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.11E+01	J				1.75E+01	J				2.93E+01	B			
SEMIVOLATILE ORGANIC COMPOUNDS																			
bis(2-Ethylhexyl)phthalate	mg/kg		4.52E+01	9.30E-01	ND					ND					ND				
VOLATILE ORGANIC COMPOUNDS																			
2-Butanone	mg/kg		4.66E+03	8.96E+01	ND					ND					3.80E-03	J			
Acetone	mg/kg		7.76E+02	2.50E+00	ND					ND					1.40E+00	J			
Methylene chloride	mg/kg		8.41E+01	2.00E+00	3.60E-03	B				2.80E-02	B				4.50E-03	B			
Naphthalene	mg/kg	3.30E-02	1.55E+02	1.00E-01	ND					ND					ND				
Toluene	mg/kg		1.55E+03	5.00E-02	ND					6.70E-04	J				2.50E-03	J			

Table 2-4

Surface and Depositional Soil Analytical Results
Range 24A Fog Oil Drum Storage, Parcel 88(6)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Parcel			Site [b]	Ecological [b]	FTA-88-GP02					FTA-88-GP03					FTA-88-GP04				
Sample Location			Specific	Screening	FTA-88					FTA-88					FTA-88				
Sample Number			Screening	Values	FR0003					FR0005					FR0007				
Sample Date			Levels		30-Oct-98					14-Sep-99					14-Sep-99				
Sample Depth (Feet)					0- 1					0- 1					0- 1				
Parameter	Units	BKG [a]	SSSL	ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	6.96E+03				YES	1.06E+04			YES	YES	4.52E+03				YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	4.70E+00			YES		3.20E+00			YES		3.30E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	2.61E+01					4.33E+01					1.60E+01	J			
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	7.50E-01					3.90E-01	J				4.20E-01	J			
Calcium	mg/kg	1.72E+03			1.77E+03		YES			1.71E+04		YES			1.46E+03				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.82E+01				YES	1.25E+01				YES	9.30E+00				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	ND					4.60E+00	J				1.80E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.43E+01		YES			5.40E+00					6.30E+00				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	3.10E+04			YES	YES	1.39E+04			YES	YES	1.06E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	7.40E+00					8.40E+00					1.00E+01				
Magnesium	mg/kg	1.03E+03		4.40E+05	8.80E+02					4.21E+03		YES			6.85E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	2.27E+02				YES	3.50E+02				YES	2.41E+01				
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	ND					8.10E-02		YES			1.60E-01		YES		YES
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	5.10E+00					4.80E+00					2.90E+00	J			
Potassium	mg/kg	8.00E+02			1.04E+03		YES			5.54E+02					8.37E+02		YES		
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	ND					5.50E-01	B	YES			6.60E-01	B	YES		
Sodium	mg/kg	6.34E+02			ND					9.80E+01	B				5.76E+01	B			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					4.20E-01	J				ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	ND					2.05E+01				YES	1.24E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.48E+01	B				1.71E+01					4.22E+01		YES		
SEMIVOLATILE ORGANIC COMPOUNDS																			
bis(2-Ethylhexyl)phthalate	mg/kg		4.52E+01	9.30E-01	ND					4.30E-02	B				5.90E-02	B			
VOLATILE ORGANIC COMPOUNDS																			
2-Butanone	mg/kg		4.66E+03	8.96E+01	2.90E-03	J				8.00E-03	J				ND				
Acetone	mg/kg		7.76E+02	2.50E+00	4.20E-02	B				5.10E-02	J				ND				
Methylene chloride	mg/kg		8.41E+01	2.00E+00	3.40E-03	B				4.30E-03	B				3.90E-03	B			
Naphthalene	mg/kg	3.30E-02	1.55E+02	1.00E-01	ND					1.10E-03	J				ND				
Toluene	mg/kg		1.55E+03	5.00E-02	ND					ND					ND				

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III where applicable

a Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corp. (1998, *Final Background Metals Survey Report, Fort McClellan, Alabama.* July.)

b Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000). *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/kg - Milligrams per kilogram

NA - Not available

ND - not detected

Qual - Data validation qualifier

Table 2-5

Surface and Depositional Soil Analytical Results
Range 24A Multi-Purpose Range, Parcel 108(7)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Location Parcel Sample Number Sample Date Sample Depth (Feet)					FTA-108-DEP01 FTA-108 FT0025 30-Sep-99 0- .5					FTA-108-DEP02 FTA-108 FT0026 30-Sep-99 0- .25					FTA-108-DEP03 FTA-108 FT0027 30-Sep-99 0- .25					FTA-108-GP01 FTA-108 FT0001 30-Oct-98 0- 1				
Parameter	**Units**	**BKG [a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
PESTICIDES																								
4,4'-DDE	mg/kg		1.79E+00	2.50E-03	ND					ND					ND					ND				
Endrin aldehyde	mg/kg		2.32E-01	1.05E-02	ND					ND					1.00E-03	J				ND				
Endrin ketone	mg/kg		2.32E-01	1.05E-02	ND					ND					1.30E-03	J				ND				
METALS																								
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	6.61E+03				YES	5.95E+03				YES	1.54E+04			YES	YES	1.67E+04		YES	YES	YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	3.30E+00			YES		3.30E+00			YES		4.20E+00			YES		4.00E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	2.74E+01					8.20E+01					4.84E+01					3.60E+01	J			
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	5.50E-01	J				6.10E-01					3.30E-01	J				ND				
Calcium	mg/kg	1.72E+03			7.86E+01	B				7.55E+02					1.96E+03		YES			3.58E+03		YES		
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.76E+01				YES	9.80E+00				YES	1.77E+01				YES	1.39E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	3.00E+00	J				1.09E+01					2.10E+00	J				ND				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.04E+01					2.72E+01		YES			6.60E+00					9.00E+00				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	2.41E+04			YES	YES	2.01E+04			YES	YES	1.85E+04			YES	YES	1.75E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	5.80E+00					5.63E+01		YES		YES	7.60E+00					7.00E+00				
Magnesium	mg/kg	1.03E+03		4.40E+05	1.66E+02	J				4.37E+02	J				7.78E+02					2.35E+03		YES		
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	1.63E+02				YES	4.14E+02			YES	YES	6.52E+01					4.88E+01	J			
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	4.10E-02	B				4.50E-02	B				9.90E-02	B	YES			4.80E-02				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	4.10E+00	J				1.04E+01		YES			3.90E+00	J				5.20E+00				
Potassium	mg/kg	8.00E+02			4.65E+02	J				1.44E+03		YES			3.74E+02	J				ND				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	ND					ND					ND					ND				
Sodium	mg/kg	6.34E+02			5.01E+01	B				5.44E+01	B				2.29E+02	B				ND				
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	2.27E+01				YES	1.13E+01				YES	2.95E+01				YES	1.08E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	4.43E+01		YES			5.78E+01		YES		YES	2.20E+01					1.98E+01	B			
SEMIVOLATILE ORGANIC COMPOUNDS																								
Butyl benzyl phthalate	mg/kg		1.56E+03	2.40E-01	ND					ND					ND					ND				
bis(2-Ethylhexyl)phthalate	mg/kg		4.52E+01	9.30E-01	1.30E-01	B				1.60E-01	B				ND					ND				
VOLATILE ORGANIC COMPOUNDS																								
1,2,4-Trimethylbenzene	mg/kg		3.88E+02	1.00E-01	ND					ND					ND					ND				
2-Butanone	mg/kg		4.66E+03	8.96E+01	ND					ND					ND					ND				
Acetone	mg/kg		7.76E+02	2.50E+00	ND					ND					ND					1.50E-02	B			
Bromomethane	mg/kg		1.09E+01		ND					ND					ND					ND				
Ethylbenzene	mg/kg		7.77E+02	5.00E-02	ND					ND					ND					ND				
Methylene chloride	mg/kg		8.41E+01	2.00E+00	4.00E-03	B				3.80E-03	B				3.20E-03	B				2.50E-03	B			
Styrene	mg/kg		1.55E+03	1.00E-01	ND					ND					ND					ND				
Toluene	mg/kg		1.55E+03	5.00E-02	ND					ND					ND					ND				
Trichlorofluoromethane	mg/kg		2.33E+03	1.00E-01	ND					ND					ND					ND				
cis-1,2-Dichloroethene	mg/kg		7.77E+01	1.00E-01	ND					ND					ND					ND				
p-Cymene	mg/kg		1.55E+03		ND					ND					ND					ND				

Table 2-5

Surface and Depositional Soil Analytical Results
Range 24A Multi-Purpose Range, Parcel 108(7)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Location					FTA-108-GP02					FTA-108-GP03					FTA-108-GP04				
Parcel					FTA-108					FTA-108					FTA-108				
Sample Number					FT0005					FT0009					FT0011				
Sample Date					30-Oct-98					30-Oct-98					03-Nov-98				
Sample Depth (Feet)					0- 1					0- 1					0- 1				
Parameter	**Units**	**BKG [a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
PESTICIDES																			
4,4'-DDE	mg/kg		1.79E+00	2.50E-03	ND					ND					ND				
Endrin aldehyde	mg/kg		2.32E-01	1.05E-02	ND					ND					ND				
Endrin ketone	mg/kg		2.32E-01	1.05E-02	ND					ND					ND				
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	7.60E+03				YES	9.63E+03			YES	YES	1.18E+04			YES	YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	4.70E+00			YES		3.40E+00			YES		3.60E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	ND					7.65E+01	J				1.02E+02	J			
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	ND					5.60E-01					1.00E+00		YES		
Calcium	mg/kg	1.72E+03			7.41E+02					7.49E+03		YES			ND				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.35E+01				YES	1.26E+01				YES	1.62E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	ND					ND					7.00E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	4.20E+00					6.30E+00					1.42E+02		YES		YES
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.32E+04			YES	YES	1.61E+04			YES	YES	2.65E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	7.40E+00					1.00E+01					1.79E+01				
Magnesium	mg/kg	1.03E+03		4.40E+05	ND					3.93E+03		YES			ND				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	2.47E+02	J			YES	3.93E+02	J		YES	YES	1.01E+03	J		YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	3.90E-02					3.80E-02					4.60E-02				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	ND					4.70E+00					6.20E+00				
Potassium	mg/kg	8.00E+02			ND					6.54E+02					ND				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	ND					ND					7.10E-01		YES		
Sodium	mg/kg	6.34E+02			ND					ND					ND				
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	1.78E+01				YES	9.20E+00				YES	8.00E+00				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	8.40E+00	B				3.45E+01					2.40E+02		YES		YES
SEMIVOLATILE ORGANIC COMPOUNDS																			
Butyl benzyl phthalate	mg/kg		1.56E+03	2.40E-01	ND					ND					ND				
bis(2-Ethylhexyl)phthalate	mg/kg		4.52E+01	9.30E-01	ND					ND					ND				
VOLATILE ORGANIC COMPOUNDS																			
1,2,4-Trimethylbenzene	mg/kg		3.88E+02	1.00E-01	ND					ND					3.50E-03	J			
2-Butanone	mg/kg		4.66E+03	8.96E+01	5.50E-03	J				6.80E-03	J				8.90E-03	B			
Acetone	mg/kg		7.76E+02	2.50E+00	9.30E-02	J				1.20E-01	J				1.20E-01	J			
Bromomethane	mg/kg		1.09E+01		ND					ND					ND				
Ethylbenzene	mg/kg		7.77E+02	5.00E-02	ND					ND					ND				
Methylene chloride	mg/kg		8.41E+01	2.00E+00	2.90E-03	B				4.80E-03	B				4.60E-03	B			
Styrene	mg/kg		1.55E+03	1.00E-01	ND					ND					ND				
Toluene	mg/kg		1.55E+03	5.00E-02	ND					3.10E-03	J				2.30E-03	J			
Trichlorofluoromethane	mg/kg		2.33E+03	1.00E-01	ND					ND					ND				
cis-1,2-Dichloroethene	mg/kg		7.77E+01	1.00E-01	ND					ND					ND				
p-Cymene	mg/kg		1.55E+03		ND					4.50E-03	J				ND				

Table 2-5

Surface and Depositional Soil Analytical Results
Range 24A Multi-Purpose Range, Parcel 108(7)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Location					FTA-108-GP05					FTA-108-GP06					FTA-108-GP07				
Parcel					FTA-108					FTA-108					FTA-108				
Sample Number					FT0013					FT0015					FT0017				
Sample Date					03-Nov-98					13-Sep-99					13-Sep-99				
Sample Depth (Feet)					0- 1					0- 1					0- 1				
Parameter	**Units**	**BKG [a]**	**SSSL [b]**	**ESV [b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
PESTICIDES																			
4,4'-DDE	mg/kg		1.79E+00	2.50E-03	ND					ND					7.00E-04	J			
Endrin aldehyde	mg/kg		2.32E-01	1.05E-02	ND					ND					ND				
Endrin ketone	mg/kg		2.32E-01	1.05E-02	ND					ND					ND				
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	1.28E+04			YES	YES	7.81E+03			YES	YES	7.72E+03				YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	3.40E+00			YES		3.10E+00			YES		1.80E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	7.26E+01	J				2.00E+02		YES		YES	8.55E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	1.10E+00		YES		YES	1.00E+00		YES			5.50E-01	J			
Calcium	mg/kg	1.72E+03			ND					7.18E+02					1.44E+02	J			
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.67E+01				YES	7.10E+00	J			YES	5.50E+00	J			YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	7.80E+00					8.90E+00					4.70E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	2.73E+01		YES			7.90E+00	J				2.24E+01	J	YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	2.60E+04			YES	YES	1.40E+04			YES	YES	1.02E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	9.70E+00					2.62E+01					1.89E+02		YES		YES
Magnesium	mg/kg	1.03E+03		4.40E+05	ND					4.62E+02	J				4.02E+02	J			
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	8.74E+02	J		YES	YES	8.13E+02			YES	YES	8.23E+01				
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	ND					5.00E-02					5.50E-02				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	6.80E+00					6.50E+00					4.80E+00				
Potassium	mg/kg	8.00E+02			ND					1.98E+03		YES			1.12E+03		YES		
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	6.60E-01		YES			1.00E+00	B	YES		YES	1.20E+00	B	YES		YES
Sodium	mg/kg	6.34E+02			ND					5.46E+01	B				5.05E+01	B			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					9.10E-01	J		YES		ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	8.90E+00				YES	1.10E+01				YES	1.00E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	6.55E+01		YES		YES	2.76E+01					1.93E+01				
SEMIVOLATILE ORGANIC COMPOUNDS																			
Butyl benzyl phthalate	mg/kg		1.56E+03	2.40E-01	ND					ND					4.20E-02	J			
bis(2-Ethylhexyl)phthalate	mg/kg		4.52E+01	9.30E-01	ND					4.90E-01	B				6.10E-01	B			
VOLATILE ORGANIC COMPOUNDS																			
1,2,4-Trimethylbenzene	mg/kg		3.88E+02	1.00E-01	ND					ND					ND				
2-Butanone	mg/kg		4.66E+03	8.96E+01	1.10E-02	B				ND					6.00E-03	J			
Acetone	mg/kg		7.76E+02	2.50E+00	9.90E-02	J				8.80E-02	J				1.40E-01	J			
Bromomethane	mg/kg		1.09E+01		3.40E-03	J				ND					ND				
Ethylbenzene	mg/kg		7.77E+02	5.00E-02	ND					ND					ND				
Methylene chloride	mg/kg		8.41E+01	2.00E+00	4.40E-03	B				6.90E-03	B				5.40E-03	B			
Styrene	mg/kg		1.55E+03	1.00E-01	ND					ND					8.90E-04	J			
Toluene	mg/kg		1.55E+03	5.00E-02	2.10E-03	J				9.90E-04	J				1.30E-03	J			
Trichlorofluoromethane	mg/kg		2.33E+03	1.00E-01	ND					ND					ND				
cis-1,2-Dichloroethene	mg/kg		7.77E+01	1.00E-01	ND					ND					ND				
p-Cymene	mg/kg		1.55E+03		ND					1.60E-03	J				1.80E-02	J			

Table 2-5

Surface and Depositional Soil Analytical Results
Range 24A Multi-Purpose Range, Parcel 108(7)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Location					FTA-108-GP08					FTA-108-GP09					FTA-108-GP10				
Parcel					FTA-108					FTA-108					FTA-108				
Sample Number					FT0019					FT0021					FT0023				
Sample Date					14-Sep-99					13-Sep-99					02-Nov-98				
Sample Depth (Feet)					0- 1					0- 1					0- 1				
Parameter	**Units**	**BKG [a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
PESTICIDES																			
4,4'-DDE	mg/kg		1.79E+00	2.50E-03	ND					ND					ND				
Endrin aldehyde	mg/kg		2.32E-01	1.05E-02	ND					ND					ND				
Endrin ketone	mg/kg		2.32E-01	1.05E-02	ND					ND					ND				
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	1.26E+04			YES	YES	9.27E+03			YES	YES	8.69E+03			YES	YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	3.30E+00			YES		4.00E+00			YES		2.50E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	1.06E+02					5.32E+01					1.14E+02	J			
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	6.40E-01					5.20E-01	J				7.40E-01				
Calcium	mg/kg	1.72E+03			2.15E+02	J				4.07E+02	J				ND				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	9.10E+00	J			YES	7.40E+00	J			YES	1.34E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	4.00E+00	J				1.60E+00	J				1.11E+01				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	6.02E+01	J	YES		YES	6.50E+00	J				4.14E+01		YES		YES
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.36E+04			YES	YES	1.12E+04			YES	YES	2.14E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	2.91E+02		YES		YES	2.93E+01					1.82E+02		YES		YES
Magnesium	mg/kg	1.03E+03		4.40E+05	4.64E+02	J				3.52E+02	J				6.86E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	2.55E+02				YES	1.16E+02				YES	2.40E+02	J			YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	5.20E-02					3.40E-02	J				ND				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	4.10E+00	J				2.60E+00	J				1.36E+01	J	YES		
Potassium	mg/kg	8.00E+02			1.00E+03		YES			1.94E+03		YES			ND				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	9.10E-01	B	YES		YES	1.00E+00	B	YES		YES	7.90E-01		YES		
Sodium	mg/kg	6.34E+02			4.56E+01	B				5.44E+01	B				ND				
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	1.50E+01				YES	1.42E+01				YES	ND				
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	2.13E+01					1.06E+01					5.13E+01		YES		YES
SEMIVOLATILE ORGANIC COMPOUNDS																			
Butyl benzyl phthalate	mg/kg		1.56E+03	2.40E-01	ND					ND					ND				
bis(2-Ethylhexyl)phthalate	mg/kg		4.52E+01	9.30E-01	4.60E-02	B				4.90E-01	B				6.00E-02	J			
VOLATILE ORGANIC COMPOUNDS																			
1,2,4-Trimethylbenzene	mg/kg		3.88E+02	1.00E-01	ND					ND					ND				
2-Butanone	mg/kg		4.66E+03	8.96E+01	ND					5.70E-03	J				6.50E-03	B			
Acetone	mg/kg		7.76E+02	2.50E+00	9.30E-02	B				8.50E-02	J				5.60E-02	B			
Bromomethane	mg/kg		1.09E+01		ND					ND					ND				
Ethylbenzene	mg/kg		7.77E+02	5.00E-02	ND					ND					7.00E-03	J			
Methylene chloride	mg/kg		8.41E+01	2.00E+00	3.40E-03	B				6.50E-03	B				4.60E-03	B			
Styrene	mg/kg		1.55E+03	1.00E-01	ND					ND					ND				
Toluene	mg/kg		1.55E+03	5.00E-02	8.90E-04	J				9.10E-04	J				3.30E-03	J			
Trichlorofluoromethane	mg/kg		2.33E+03	1.00E-01	2.80E-03	J				ND					ND				
cis-1,2-Dichloroethene	mg/kg		7.77E+01	1.00E-01	ND					ND					8.30E-03	J			
p-Cymene	mg/kg		1.55E+03		ND					1.30E-03	J				ND				

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III where applicable

a Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corp. (1998, Final Background Metals Survey Report, Fort McClellan, Alabama. July.

b Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000). Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/kg - Milligrams per kilogram

NA - Not available

ND - not detected

Qual - Data validation qualifier

Table 2-6

Subsurface Soil Analytical Results
Range 24A Fog Oil Drum Storage, Parcel 88(6)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Location Parcel Sample Number Sample Date Sample Depth (Feet)				FTA-88-GP01 FTA-88 FR0002 30-Oct-98 4.0-5.0				FTA-88-GP02 FTA-88 FR0004 30-Oct-98 6.0-8.0				FTA-88-GP03 FTA-88 FR0006 14-Sep-99 4.0-6.0				FTA-88-GP04 FTA-88 FR0010 14-Sep-99 4.0-6.0			
Parameter	**Units**	**BKG [a]**	**SSSL[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**
METALS																			
Aluminum	mg/kg	1.36E+04	7.80E+03	2.55E+03				7.89E+03			YES	7.84E+03			YES	9.52E+03			YES
Arsenic	mg/kg	1.83E+01	4.26E-01	2.40E+00			YES	2.30E+00			YES	9.30E+00			YES	3.60E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	ND				ND				2.48E+01				4.27E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	ND				ND				9.30E-01		YES		5.40E-01	J		
Calcium	mg/kg	6.37E+02		ND				ND				1.44E+02	J			1.06E+03		YES	
Chromium	mg/kg	3.83E+01	2.32E+01	8.80E+00				8.20E+00				2.02E+01				1.08E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	ND				ND				4.80E+00	J			4.10E+00	J		
Copper	mg/kg	1.94E+01	3.13E+02	4.00E+00				5.30E+00				1.66E+01				6.20E+00			
Iron	mg/kg	4.48E+04	2.34E+03	1.24E+04			YES	1.20E+04			YES	6.49E+04		YES	YES	1.43E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	5.00E+00				5.90E+00				4.20E+00				1.56E+01			
Magnesium	mg/kg	7.66E+02		ND				ND				1.83E+02	J			3.42E+02	J		
Manganese	mg/kg	1.36E+03	3.63E+02	1.23E+02				5.32E+01				8.25E+01				1.70E+02			
Mercury	mg/kg	7.00E-02	2.33E+00	ND				ND				2.20E-02	B			6.10E-02			
Nickel	mg/kg	1.29E+01	1.54E+02	ND				ND				4.70E+00	J			4.20E+00	J		
Potassium	mg/kg	7.11E+02		ND				ND				2.21E+03		YES		3.56E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	ND				ND				1.80E+00	B	YES		7.60E-01	B	YES	
Sodium	mg/kg	7.02E+02		ND				ND				6.53E+01	B			5.01E+01	B		
Vanadium	mg/kg	6.49E+01	5.31E+01	ND				7.50E+00				2.90E+01				2.06E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	6.20E+00	B			8.90E+00	B			1.35E+01				1.52E+01			
SEMIVOLATILE ORGANIC COMPOUNDS																			
bis(2-Ethylhexyl)phthalate	mg/kg		4.52E+01	ND				ND				4.90E-02	B			5.80E-02	B		
VOLATILE ORGANIC COMPOUNDS																			
2-Butanone	mg/kg		4.66E+03	6.70E-03	J			ND				ND				ND			
Acetone	mg/kg		7.76E+02	4.00E-01	J			9.70E-03	B			1.00E-02	B			1.30E-02	B		
Bromomethane	mg/kg		1.09E+01	1.50E-03	J			ND				ND				ND			
Methylene chloride	mg/kg		8.41E+01	2.90E-03	B			2.50E-03	B			5.60E-03	B			4.70E-03	B		

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III where applicable

a Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corp. (1998, *Final Background Metals Survey Report, Fort McClellan, Alabama.* July.

b Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000). *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/kg - Milligrams per kilogram

NA - Not available

ND - not detected

Qual - Data validation qualifier

Table 2-7

Subsurface Soil Analytical Results
Range 24A Multi-Purpose Range, Parcel 108(7)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)			Site [b] Specific Screening Levels	FTA-108-GP01 FTA-108 FT0004 30-Oct-98 1.0-2.0				FTA-108-GP02 FTA-108 FT0008 30-Oct-98 1.0 - 3.0				FTA-108-GP03 FTA-108 FT0010 30-Oct-98 1.0 - 3.0			
Parameter	**Units**	**BKG [a]**	**SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**
METALS															
Aluminum	mg/kg	1.36E+04	7.80E+03	1.45E+04		YES	YES	1.15E+04			YES	6.50E+03			
Arsenic	mg/kg	1.83E+01	4.26E-01	4.30E+00			YES	4.40E+00			YES	3.30E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	3.19E+01	J			4.60E+01	J			1.08E+02	J		
Beryllium	mg/kg	8.60E-01	9.60E+00	ND				ND				6.50E-01			
Calcium	mg/kg	6.37E+02		1.71E+03		YES		ND				8.44E+03		YES	
Chromium	mg/kg	3.83E+01	2.32E+01	1.36E+01				1.48E+01				1.33E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	ND				ND				6.00E+00			
Copper	mg/kg	1.94E+01	3.13E+02	8.10E+00				6.60E+00				7.00E+00			
Iron	mg/kg	4.48E+04	2.34E+03	1.82E+04			YES	2.08E+04			YES	1.85E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	6.60E+00				7.80E+00				7.70E+00			
Magnesium	mg/kg	7.66E+02		1.26E+03		YES		ND				4.79E+03		YES	
Manganese	mg/kg	1.36E+03	3.63E+02	4.87E+01	J			1.55E+02	J			3.48E+02	J		
Mercury	mg/kg	7.00E-02	2.33E+00	5.30E-02				4.10E-02				ND			
Nickel	mg/kg	1.29E+01	1.54E+02	5.20E+00				4.80E+00				ND			
Potassium	mg/kg	7.11E+02		6.19E+02				ND				9.92E+02		YES	
Selenium	mg/kg	4.70E-01	3.91E+01	ND				6.20E-01		YES		ND			
Sodium	mg/kg	7.02E+02		ND				ND				ND			
Thallium	mg/kg	1.40E+00	5.08E-01	ND				ND				ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	7.80E+00				1.17E+01				ND			
Zinc	mg/kg	3.49E+01	2.34E+03	1.68E+01	B			1.59E+01	B			1.70E+01	B		
SEMIVOLATILE ORGANIC COMPOUNDS															
Diethyl phthalate	mg/kg		6.23E+03	ND				ND				ND			
bis(2-Ethylhexyl)phthalate	mg/kg		4.52E+01	ND				ND				ND			
VOLATILE ORGANIC COMPOUNDS															
2-Butanone	mg/kg		4.66E+03	ND				ND				9.30E-03	J		
Acetone	mg/kg		7.76E+02	7.50E-02	J			4.70E-01	J			8.40E-01	J		
Methylene chloride	mg/kg		8.41E+01	2.00E-03	B			4.00E-03	B			3.30E-03	B		
Styrene	mg/kg		1.55E+03	ND				ND				ND			
Toluene	mg/kg		1.55E+03	ND				ND				ND			
Trichlorofluoromethane	mg/kg		2.33E+03	ND				ND				ND			

Table 2-7

Subsurface Soil Analytical Results
Range 24A Multi-Purpose Range, Parcel 108(7)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)			Site [b] Specific Screening Levels	FTA-108-GP04 FTA-108 FT0012 03-Nov-98 5.0-7.0				FTA-108-GP05 FTA-108 FT0014 02-Nov-98 7.0-9.0				FTA-108-GP06 FTA-108 FT0016 13-Sep-99 1.0-3.0			
Parameter	**Units**	**BKG [a]**	**SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**
METALS															
Aluminum	mg/kg	1.36E+04	7.80E+03	9.07E+03			YES	5.11E+03				6.25E+03			
Arsenic	mg/kg	1.83E+01	4.26E-01	4.60E+00			YES	1.14E+01			YES	3.00E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	3.99E+01	J			3.98E+01	J			1.47E+02			
Beryllium	mg/kg	8.60E-01	9.60E+00	ND				2.20E+00		YES		8.60E-01		YES	
Calcium	mg/kg	6.37E+02		ND				ND				2.85E+02	J		
Chromium	mg/kg	3.83E+01	2.32E+01	2.03E+01				1.40E+01				9.10E+00	J		
Cobalt	mg/kg	1.75E+01	4.68E+02	ND				1.07E+01				6.20E+00			
Copper	mg/kg	1.94E+01	3.13E+02	1.84E+01				3.68E+01		YES		6.30E+00	J		
Iron	mg/kg	4.48E+04	2.34E+03	3.00E+04			YES	7.54E+04		YES	YES	1.40E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	7.00E+00				5.80E+00				1.26E+01			
Magnesium	mg/kg	7.66E+02		ND				ND				3.07E+02	J		
Manganese	mg/kg	1.36E+03	3.63E+02	2.25E+02	J			2.20E+02	J			5.76E+02			YES
Mercury	mg/kg	7.00E-02	2.33E+00	ND				ND				2.80E-02	J		
Nickel	mg/kg	1.29E+01	1.54E+02	ND				1.27E+01				6.00E+00			
Potassium	mg/kg	7.11E+02		7.15E+02		YES		2.36E+03		YES		1.44E+03		YES	
Selenium	mg/kg	4.70E-01	3.91E+01	7.60E-01		YES		9.00E-01		YES		8.60E-01	B	YES	
Sodium	mg/kg	7.02E+02		ND				ND				4.95E+01	B		
Thallium	mg/kg	1.40E+00	5.08E-01	ND				ND				4.20E-01	J		
Vanadium	mg/kg	6.49E+01	5.31E+01	1.14E+01				ND				8.80E+00			
Zinc	mg/kg	3.49E+01	2.34E+03	2.24E+01				3.87E+01		YES		1.21E+01			
SEMIVOLATILE ORGANIC COMPOUNDS															
Diethyl phthalate	mg/kg		6.23E+03	ND				ND				5.90E-02	J		
bis(2-Ethylhexyl)phthalate	mg/kg		4.52E+01	ND				5.00E-02	J			5.30E-01	B		
VOLATILE ORGANIC COMPOUNDS															
2-Butanone	mg/kg		4.66E+03	ND				ND				8.70E-03	J		
Acetone	mg/kg		7.76E+02	3.20E-02	B			7.00E-02	B			2.40E-01	J		
Methylene chloride	mg/kg		8.41E+01	4.10E-03	B			4.00E-03	B			3.90E-03	B		
Styrene	mg/kg		1.55E+03	ND				ND				8.50E-03			
Toluene	mg/kg		1.55E+03	ND				ND				ND			
Trichlorofluoromethane	mg/kg		2.33E+03	ND				ND				ND			

Table 2-7

Subsurface Soil Analytical Results
Range 24A Multi-Purpose Range, Parcel 108(7)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)			Site [b] Specific Screening Levels	FTA-108-GP07 FTA-108 FT0018 13-Sep-99 2.0-4.0				FTA-108-GP08 FTA-108 FT0020 14-Sep-99 6.0-8.0				FTA-108-GP09 FTA-108 FT0022 13-Sep-99 2.0-4.0				FTA-108-GP10 FTA-108 FT0024 02-Nov-98 2.0-4.0			
Parameter	**Units**	**BKG [a]**	**SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**
METALS																			
Aluminum	mg/kg	1.36E+04	7.80E+03	6.53E+03				1.41E+04		YES	YES	7.19E+03				1.24E+04			YES
Arsenic	mg/kg	1.83E+01	4.26E-01	3.60E+00			YES	4.30E+00			YES	3.30E+00			YES	4.20E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	4.93E+01				6.48E+01				3.74E+01				9.74E+01	J		
Beryllium	mg/kg	8.60E-01	9.60E+00	5.90E-01				5.90E-01				6.00E-01				7.80E-01			
Calcium	mg/kg	6.37E+02		7.68E+01	J			5.08E+01	J			7.69E+01	J			ND			
Chromium	mg/kg	3.83E+01	2.32E+01	8.80E+00	J			1.17E+01	J			4.50E+00	J			2.18E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	2.60E+00	J			2.40E+00	J			7.50E-01	J			2.61E+01		YES	
Copper	mg/kg	1.94E+01	3.13E+02	1.06E+01	J			1.17E+01	J			3.60E+00	J			3.78E+01		YES	
Iron	mg/kg	4.48E+04	2.34E+03	1.98E+04			YES	1.85E+04			YES	6.52E+03			YES	4.74E+04		YES	YES
Lead	mg/kg	3.85E+01	4.00E+02	1.88E+01				4.88E+01		YES		8.80E+00				8.30E+00			
Magnesium	mg/kg	7.66E+02		4.05E+02	J			4.08E+02	J			2.40E+02	J			2.34E+03		YES	
Manganese	mg/kg	1.36E+03	3.63E+02	7.11E+01				7.05E+01				1.88E+01				8.03E+02	J		YES
Mercury	mg/kg	7.00E-02	2.33E+00	2.80E-02	J			2.60E-02	J			1.80E-02	J			ND			
Nickel	mg/kg	1.29E+01	1.54E+02	5.90E+00				4.80E+00				2.00E+00	J			3.03E+01		YES	
Potassium	mg/kg	7.11E+02		2.43E+03		YES		1.87E+03		YES		3.31E+03		YES		5.63E+02			
Selenium	mg/kg	4.70E-01	3.91E+01	1.30E+00	B	YES		1.10E+00	B	YES		ND				ND			
Sodium	mg/kg	7.02E+02		5.40E+01	B			6.42E+01	B			5.43E+01	B			ND			
Thallium	mg/kg	1.40E+00	5.08E-01	ND				ND				ND				ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	1.04E+01				1.59E+01				7.70E+00				ND			
Zinc	mg/kg	3.49E+01	2.34E+03	1.00E+01				1.37E+01				5.20E+00				5.99E+01		YES	
SEMIVOLATILE ORGANIC COMPOUNDS																			
Diethyl phthalate	mg/kg		6.23E+03	ND				ND				ND				ND			
bis(2-Ethylhexyl)phthalate	mg/kg		4.52E+01	4.00E-01	B			5.60E-02	B			5.70E-01	B			ND			
VOLATILE ORGANIC COMPOUNDS																			
2-Butanone	mg/kg		4.66E+03	ND				ND				ND				3.30E-03	B		
Acetone	mg/kg		7.76E+02	1.10E-02	B			1.40E-02	B			ND				5.60E-02	B		
Methylene chloride	mg/kg		8.41E+01	5.10E-03	B			4.60E-03	B			5.60E-03	B			3.30E-03	B		
Styrene	mg/kg		1.55E+03	ND				ND				ND				ND			
Toluene	mg/kg		1.55E+03	8.10E-04	J			1.10E-03	J			ND				ND			
Trichlorofluoromethane	mg/kg		2.33E+03	ND				3.70E-03	J			ND				ND			

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III where applicable

a Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corp. (1998, *Final Background Metals Survey Report, Fort McClellan, Alabama* . July

b Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000). Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/kg - Milligrams per kilogram

NA - Not available

ND - not detected

Qual - Data validation qualifier

Table 2-8

Groundwater Analytical Results
Range 24A Fog Oil Drum Storage, Parcel 88(6)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Parcel Sample Location Sample Number Sample Date			Site [b] Specific Screening Levels	FTA-88-GP01 FTA-88 FR3001 09-Nov-99				FTA-88-GP02 FTA-88 FR3002 09-Nov-99				FTA-88-GP03 FTA-88 FR3003 08-Nov-99				FTA-88-GP04 FTA-88 FR3004 08-Nov-99			
Parameter	**Units**	**BKG [a]**	**SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**
METALS																			
Aluminum	mg/L	2.34E+00	1.56E+00	1.95E-01	B			5.53E-01	B			1.11E+00	J			1.40E-01	B		
Barium	mg/L	1.27E-01	1.10E-01	4.24E-02	J			1.39E-02	J			2.91E-02	J			5.75E-02	J		
Beryllium	mg/L	1.24E-03	3.12E-03	6.30E-04	B			7.20E-04	B			7.60E-04	B			ND			
Calcium	mg/L	5.65E+01		1.56E+01				2.30E+00	J			1.30E+00	J			5.98E+01		YES	
Chromium	mg/L		4.69E-03	ND				5.00E-03	J		YES	3.40E-03	J			ND			
Cobalt	mg/L	2.34E-02	9.39E-02	7.60E-03	J			ND				ND				4.40E-03	J		
Iron	mg/L	7.04E+00	4.69E-01	3.97E-01				6.13E-01			YES	6.83E-01			YES	1.10E+01		YES	YES
Magnesium	mg/L	2.13E+01		3.29E+00	J			4.48E-01	J			4.29E-01	J			2.54E+01		YES	
Manganese	mg/L	5.81E-01	7.35E-02	1.68E+00		YES	YES	9.07E-02			YES	1.39E-01			YES	1.48E+00		YES	YES
Nickel	mg/L		3.13E-02	4.20E-03	J			5.40E-03	J			3.10E-03	J			ND			
Potassium	mg/L	7.20E+00		1.88E+00	J			8.68E-01	J			1.52E+00	J			1.60E+00	J		
Sodium	mg/L	1.48E+01		1.53E+00	B			1.10E+00	B			1.17E+00	B			2.50E+00	J		
Thallium	mg/L	1.45E-03	1.00E-04	ND				5.10E-03	B	YES	YES	7.40E-03	B	YES	YES	8.40E-03	B	YES	YES
Zinc	mg/L	2.20E-01	4.69E-01	7.90E-03	J			3.80E-03	J			4.20E-03	J			6.10E-03	J		
SEMIVOLATILE ORGANIC COMPOUNDS																			
Naphthalene	mg/L		3.00E-03	1.00E-03	J			ND				ND				ND			
VOLATILE ORGANIC COMPOUNDS																			
1,2,4-Trimethylbenzene	mg/L		6.00E-03	7.20E-03			YES	ND				ND				ND			
1,2-Dimethylbenzene	mg/L		2.80E+00	3.30E-03	U			ND				ND				ND			
1,3,5-Trimethylbenzene	mg/L		6.00E-03	6.90E-04	J			ND				ND				ND			
Acetone	mg/L		1.56E-01	3.10E-03	B			ND				ND				ND			
Benzene	mg/L		1.40E-03	2.60E-04	J			ND				ND				ND			
Chloromethane	mg/L		3.92E-03	1.20E-04	J			ND				ND				ND			
Cumene	mg/L		1.27E-01	5.60E-04	J			ND				ND				ND			
Naphthalene	mg/L		3.00E-03	1.40E-03	U			1.50E-04	J			ND				ND			
m,p-Xylenes	mg/L		2.80E+00	1.80E-03	U			ND				ND				ND			
n-Butylbenzene	mg/L		9.57E-03	3.50E-04	J			ND				ND				ND			
n-Propylbenzene	mg/L		1.30E-02	3.30E-04	J			ND				ND				ND			
sec-Butylbenzene	mg/L		1.06E-02	1.80E-04	J			ND				ND				ND			

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III where applicable

a Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corp. (1998, *Final Background Metals Survey Report, Fort McClellan, Alabama.* July.

b Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000). *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/kg - Milligrams per kilogram

NA - Not available

ND - not detected

Qual - Data validation qualifier

Table 2-9

Groundwater Analytical Results
Range 24A Multi-Purpose Range, Parcel 108(7)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Parcel Sample Location Sample Number Sample Date			Site [b] Specific Screening Levels	FTA-108-BK-G06 FTA-108 FT3013 16-Nov-99				FTA-108-GP01 FTA-108 FT3001 10-Nov-99				FTA-108-GP02 FTA-108 FT3004 10-Nov-99				FTA-108-GP03 FTA-108 FT3005 10-Nov-99				FTA-108-GP04 FTA-108 FT3006 09-Nov-99			
Parameter	**Units**	**BKG [a]**	**SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**
PESTICIDES																							
beta-BHC	mg/L		3.00E-05	ND				1.90E-05	J			ND				ND				ND			
METALS																							
Aluminum	mg/L	2.34E+00	1.56E+00	9.45E-02	B			2.21E-01	B			1.24E+01	J	YES	YES	6.83E-01	J			6.20E+00	J	YES	YES
Arsenic	mg/L	1.78E-02	4.00E-05	ND				ND				2.60E-03	J		YES	ND				2.60E-03	J		YES
Barium	mg/L	1.27E-01	1.10E-01	2.17E-02	J			7.05E-02	J			1.31E-01	J	YES	YES	4.75E-02	J			5.82E-02	J		
Beryllium	mg/L	1.24E-03	3.12E-03	ND				ND				1.50E-03	J	YES		ND				8.40E-04	J		
Calcium	mg/L	5.65E+01		1.13E-01	B			8.00E+00				9.06E+00				9.29E+00				4.47E+00	J		
Chromium	mg/L		4.69E-03	ND				ND				9.40E-03	B		YES	ND				3.39E-02			YES
Cobalt	mg/L	2.34E-02	9.39E-02	ND				4.20E-03	J			5.40E-03	J			ND				4.10E-03	J		
Copper	mg/L	2.55E-02	6.26E-02	ND				ND				2.00E-03	B			ND				ND			
Iron	mg/L	7.04E+00	4.69E-01	4.25E-02	J			5.02E-01			YES	2.20E+01		YES	YES	4.43E-01				1.13E+01		YES	YES
Lead	mg/L	7.99E-03	1.50E-02	ND				ND				2.20E-03	J			ND				ND			
Magnesium	mg/L	2.13E+01		7.80E-02	J			1.68E+00	J			2.56E+00	J			1.24E+00	J			1.25E+00	J		
Manganese	mg/L	5.81E-01	7.35E-02	2.90E-03	J			5.28E-01			YES	5.89E-01		YES	YES	8.40E-02			YES	1.09E+00		YES	YES
Mercury	mg/L		4.60E-04	ND				ND				ND				ND				ND			
Nickel	mg/L		3.13E-02	2.10E-03	J			3.10E-03	J			1.27E-02	J			ND				1.89E-02	J		
Potassium	mg/L	7.20E+00		2.04E+00	J			4.22E+00	J			1.87E+01		YES		1.25E+01		YES		7.87E+00		YES	
Sodium	mg/L	1.48E+01		1.06E+00	J			1.16E+00	J			1.99E+00	J			5.61E+00				1.53E+00	J		
Thallium	mg/L	1.45E-03	1.00E-04	ND				ND				ND				ND				7.00E-03	B	YES	YES
Vanadium	mg/L	1.70E-02	1.10E-02	ND				ND				1.41E-02	J		YES	ND				1.30E-02	J		YES
Zinc	mg/L	2.20E-01	4.69E-01	ND				4.00E-03	J			2.33E-02				ND				6.90E-03	J		
SEMIVOLATILE ORGANIC COMPOUNDS																							
1,2-Dichlorobenzene	mg/L		2.87E-02	ND				ND				ND				ND				ND			
4-Methylphenol	mg/L		7.68E-03	ND				ND				3.60E-02			YES	ND				ND			
Di-n-butyl phthalate	mg/L		1.48E-01	ND				ND				ND				1.10E-03	J			ND			
Di-n-octyl phthalate	mg/L		3.10E-04	ND				ND				ND				ND				ND			
Phenol	mg/L		9.31E-01	ND				ND				5.70E-03	J			ND				ND			
bis(2-Ethylhexyl)phthalate	mg/L		4.30E-03	ND				ND				ND				ND				ND			
VOLATILE ORGANIC COMPOUNDS																							
2-Butanone	mg/L		7.14E-01	ND				ND				2.20E-03	B			ND				ND			
Acetone	mg/L		1.56E-01	ND				ND				1.50E-03	B			ND				ND			
Benzene	mg/L		1.40E-03	ND				ND				ND				ND				ND			
Carbon disulfide	mg/L		1.51E-01	ND				ND				ND				ND				ND			
Chloroform	mg/L		1.15E-03	ND				ND				ND				ND				1.00E-03			
Chloromethane	mg/L		3.92E-03	ND				1.50E-04	J			1.10E-04	J			1.70E-04	J			1.10E-04	J		
Ethylbenzene	mg/L		1.40E-01	ND				2.50E-04	J			ND				ND				ND			
Methylene chloride	mg/L		7.85E-03	ND				ND				ND				ND				ND			
Toluene	mg/L		2.59E-01	ND				ND				ND				ND				ND			
p-Cymene	mg/L		2.26E-01	ND				2.60E-03				1.90E-02				ND				ND			

Table 2-9

Groundwater Analytical Results
Range 24A Multi-Purpose Range, Parcel 108(7)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Parcel Sample Location Sample Number Sample Date			Site [b] Specific Screening Levels	FTA-108-GP05 FTA-108 FT3007 09-Nov-99				FTA-108-GP06 FTA-108 FT3008 12-Nov-99				FTA-108-GP07 FTA-108 FT3009 15-Nov-99				FTA-108-GP08 FTA-108 FT3010 15-Nov-99				FTA-108-GP09 FTA-108 FT3011 15-Nov-99			
Parameter	**Units**	**BKG [a]**	**SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**
PESTICIDES																							
beta-BHC	mg/L		3.00E-05	ND				ND				2.70E-05	J			ND				ND			
METALS																							
Aluminum	mg/L	2.34E+00	1.56E+00	9.52E+01	J	YES	YES	1.82E-01	B			1.02E+00	J			2.69E+01	J	YES	YES	3.42E-01	B		
Arsenic	mg/L	1.78E-02	4.00E-05	2.26E-02		YES	YES	ND				ND				1.14E-02			YES	ND			
Barium	mg/L	1.27E-01	1.10E-01	5.82E-01		YES	YES	8.07E-02	J			8.67E-02	J			2.47E-01		YES	YES	6.00E-03	J		
Beryllium	mg/L	1.24E-03	3.12E-03	9.70E-03		YES	YES	ND				ND				3.40E-03	J	YES	YES	ND			
Calcium	mg/L	5.65E+01		3.18E+00	J			3.96E+00	J			7.93E+00				3.30E+00	J			1.45E+00	J		
Chromium	mg/L		4.69E-03	2.48E-01			YES	ND				8.70E-03	B		YES	2.87E-02			YES	ND			
Cobalt	mg/L	2.34E-02	9.39E-02	2.55E-01		YES	YES	1.20E-02	B			2.40E-03	B			4.18E-02	J	YES		4.10E-03	B		
Copper	mg/L	2.55E-02	6.26E-02	8.36E-02		YES	YES	ND				ND				5.48E-02		YES		ND			
Iron	mg/L	7.04E+00	4.69E-01	2.57E+02		YES	YES	1.69E+01		YES	YES	6.85E-01			YES	5.24E+01		YES	YES	1.02E+01		YES	YES
Lead	mg/L	7.99E-03	1.50E-02	4.92E-02		YES	YES	ND				ND				2.05E-02		YES	YES	ND			
Magnesium	mg/L	2.13E+01		4.24E+00	J			4.81E+00	J			1.44E+00	J			8.05E+00				7.82E+00			
Manganese	mg/L	5.81E-01	7.35E-02	2.64E+00		YES	YES	4.80E+00		YES	YES	2.31E-01			YES	4.26E-01			YES	1.15E+00		YES	YES
Mercury	mg/L		4.60E-04	6.00E-05	J			ND				ND				ND				ND			
Nickel	mg/L		3.13E-02	2.17E-01			YES	2.80E-03	J			6.60E-03	J			8.90E-02			YES	1.08E-02	J		
Potassium	mg/L	7.20E+00		3.95E+01		YES		4.67E+00	J			7.04E+00				1.36E+01		YES		1.25E+00	J		
Sodium	mg/L	1.48E+01		1.05E+00	J			2.68E+00	J			1.73E+00	J			1.33E+00	J			1.76E+00	J		
Thallium	mg/L	1.45E-03	1.00E-04	5.80E-03	B	YES	YES	8.40E-03	B	YES	YES	ND				ND				ND			
Vanadium	mg/L	1.70E-02	1.10E-02	1.03E-01		YES	YES	ND				2.10E-03	J			2.44E-02	J	YES	YES	ND			
Zinc	mg/L	2.20E-01	4.69E-01	2.52E-01		YES		ND				4.10E-03	J			1.02E-01				9.10E-03	J		
SEMIVOLATILE ORGANIC COMPOUNDS																							
1,2-Dichlorobenzene	mg/L		2.87E-02	ND				ND				ND				ND				ND			
4-Methylphenol	mg/L		7.68E-03	ND				2.20E-02			YES	ND				ND				ND			
Di-n-butyl phthalate	mg/L		1.48E-01	ND				ND				ND				ND				ND			
Di-n-octyl phthalate	mg/L		3.10E-04	ND				1.80E-03	J		YES	ND				ND				ND			
Phenol	mg/L		9.31E-01	ND				2.60E-03	J			ND				ND				ND			
bis(2-Ethylhexyl)phthalate	mg/L		4.30E-03	1.10E-03	J			ND				ND				ND				ND			
VOLATILE ORGANIC COMPOUNDS																							
2-Butanone	mg/L		7.14E-01	ND				5.60E-03	J			ND				ND				ND			
Acetone	mg/L		1.56E-01	ND				5.90E-03	B			ND				ND				ND			
Benzene	mg/L		1.40E-03	ND				ND				ND				ND				ND			
Carbon disulfide	mg/L		1.51E-01	ND				1.30E-04	J			ND				ND				ND			
Chloroform	mg/L		1.15E-03	ND				ND				ND				ND				ND			
Chloromethane	mg/L		3.92E-03	ND				ND				ND				ND				3.10E-04	J		
Ethylbenzene	mg/L		1.40E-01	ND				ND				ND				ND				ND			
Methylene chloride	mg/L		7.85E-03	ND				ND				ND				ND				ND			
Toluene	mg/L		2.59E-01	ND				2.20E-03				ND				ND				ND			
p-Cymene	mg/L		2.26E-01	ND				6.00E-03				ND				ND				ND			

Table 2-9

Groundwater Analytical Results
Range 24A Multi-Purpose Range, Parcel 108(7)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Parcel Sample Location Sample Number Sample Date			Site [b] Specific Screening Levels	FTA-108-GP10 FTA-108 FT3012 16-Nov-99				FTA-108-T24A-G01 FTA-108 FT3014 11-Nov-99				FTA-108-T24A-G02 FTA-108 FT3017 17-Nov-99				FTA-108-T24A-G03 FTA-108 FT3018 17-Nov-99			
Parameter	**Units**	**BKG [a]**	**SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**
PESTICIDES																			
beta-BHC	mg/L		3.00E-05	ND				ND				ND				ND			
METALS																			
Aluminum	mg/L	2.34E+00	1.56E+00	2.72E+00	J	YES	YES	2.41E-01	B			1.46E-01	B			8.30E-02	B		
Arsenic	mg/L	1.78E-02	4.00E-05	ND				ND				ND				2.80E-03	J		YES
Barium	mg/L	1.27E-01	1.10E-01	1.34E-01	J	YES	YES	2.22E-02	J			1.10E-02	J			3.50E-03	J		
Beryllium	mg/L	1.24E-03	3.12E-03	5.90E-04	J			ND				ND				ND			
Calcium	mg/L	5.65E+01		6.94E-01	J			3.34E+00	J			1.15E+00	J			4.24E-01	J		
Chromium	mg/L		4.69E-03	4.00E-03	B			ND				ND				ND			
Cobalt	mg/L	2.34E-02	9.39E-02	5.89E-02		YES		3.40E-03	J			6.80E-03	B			2.90E-03	B		
Copper	mg/L	2.55E-02	6.26E-02	ND				ND				ND				ND			
Iron	mg/L	7.04E+00	4.69E-01	1.11E+01		YES	YES	1.39E+01		YES	YES	4.82E+00			YES	6.11E+00			YES
Lead	mg/L	7.99E-03	1.50E-02	ND				ND				ND				ND			
Magnesium	mg/L	2.13E+01		4.47E-01	J			9.41E+00				1.58E+01				6.47E+00			
Manganese	mg/L	5.81E-01	7.35E-02	1.81E+00		YES	YES	1.25E+00		YES	YES	2.95E+00		YES	YES	8.28E-01		YES	YES
Mercury	mg/L		4.60E-04	ND				ND				ND				ND			
Nickel	mg/L		3.13E-02	5.00E-02			YES	3.40E-03	J			7.40E-03	J			5.90E-03	J		
Potassium	mg/L	7.20E+00		3.20E+00	J			1.02E+00	J			9.98E-01	J			6.58E-01	J		
Sodium	mg/L	1.48E+01		1.86E+00	J			1.10E+00	J			2.22E+00	B			1.12E+00	B		
Thallium	mg/L	1.45E-03	1.00E-04	ND				ND				6.00E-03	J	YES	YES	7.20E-03	J	YES	YES
Vanadium	mg/L	1.70E-02	1.10E-02	2.70E-03	J			ND				ND				ND			
Zinc	mg/L	2.20E-01	4.69E-01	1.07E-02	J			1.39E-02	J			8.60E-03	J			7.40E-03	J		
SEMIVOLATILE ORGANIC COMPOUNDS																			
1,2-Dichlorobenzene	mg/L		2.87E-02	ND				ND				ND				1.10E-02			
4-Methylphenol	mg/L		7.68E-03	ND				ND				ND				ND			
Di-n-butyl phthalate	mg/L		1.48E-01	ND				ND				ND				ND			
Di-n-octyl phthalate	mg/L		3.10E-04	ND				ND				ND				ND			
Phenol	mg/L		9.31E-01	ND				1.50E-02				ND				ND			
bis(2-Ethylhexyl)phthalate	mg/L		4.30E-03	ND				ND				ND				ND			
VOLATILE ORGANIC COMPOUNDS																			
2-Butanone	mg/L		7.14E-01	ND				ND				ND				ND			
Acetone	mg/L		1.56E-01	ND				ND				ND				ND			
Benzene	mg/L		1.40E-03	ND				2.80E-01			YES	ND				ND			
Carbon disulfide	mg/L		1.51E-01	ND				ND				ND				ND			
Chloroform	mg/L		1.15E-03	ND				ND				ND				ND			
Chloromethane	mg/L		3.92E-03	1.60E-04	J			ND				1.10E-04	B			1.30E-04	B		
Ethylbenzene	mg/L		1.40E-01	ND				ND				ND				ND			
Methylene chloride	mg/L		7.85E-03	ND				3.80E-03	B			ND				ND			
Toluene	mg/L		2.59E-01	ND				ND				ND				ND			
p-Cymene	mg/L		2.26E-01	ND				ND				ND				ND			

Table 2-9

Groundwater Analytical Results
Range 24A Multi-Purpose Range, Parcel 108(7)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III where applicable

a Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corp. (1998, Final Background Metals Survey Report, Fort McClellan, Alabama. July.

b Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000). *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/kg - Milligrams per kilogram

NA - Not available

ND - not detected

Qual - Data validation qualifier

Table 2-10

Surface Water Analytical Results
Range 24A Fog Oil Drum Storage, Parcel 88(6)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Parcel Sample Location Sample Number Sample Date			Site [b] Specific Screening Levels	Ecological [b] Screening Values	FTA-88-SW/SD01 FTA-88 FR2001 29-Sep-99					FTA-88-SW/SD02 FTA-88 FR2002 29-Sep-99				
Parameter [c]	Units	BKG [a]	SSSL	ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS														
Aluminum	mg/L	5.26E+00	1.53E+01	8.70E-02	1.07E-01	J			YES	2.79E+00				YES
Barium	mg/L	7.53E-02	1.10E+00	3.90E-03	1.31E-02	J			YES	5.36E-02	J			YES
Calcium	mg/L	2.52E+01		1.16E+02	1.18E+00	J				8.75E+01		YES		
Chromium	mg/L	1.11E-02	4.08E-02	1.10E-02	ND					1.97E-02		YES		YES
Copper	mg/L	1.27E-02	6.23E-01	6.54E-03	ND					3.80E-03	B			
Iron	mg/L	1.96E+01	4.70E+00	1.00E+00	4.61E-01					2.23E+00				YES
Magnesium	mg/L	1.10E+01		8.20E+01	3.44E-01	J				8.10E+00				
Manganese	mg/L	5.65E-01	6.40E-01	8.00E-02	5.78E-02	J				3.81E-02				
Mercury	mg/L		4.25E-03	1.00E-05	ND					6.60E-05	J			YES
Potassium	mg/L	2.56E+00		5.30E+01	ND					1.00E+01		YES		
Sodium	mg/L	3.44E+00		6.80E+02	1.01E+00	B				3.97E+00	J	YES		
Thallium	mg/L	2.40E-03	1.01E-03	4.00E-03	6.70E-03	B	YES	YES	YES	ND				
Vanadium	mg/L	1.52E-02	7.90E-02	1.90E-02	ND					5.20E-03	J			
Zinc	mg/L	4.03E-02	4.65E+00	5.89E-02	4.20E-03	B				1.34E-02	B			
VOLATILE ORGANIC COMPOUNDS														
Acetone	mg/L		1.57E+00	7.80E+01	1.30E-03	B				3.80E-03	B			
Chloromethane	mg/L		8.23E-02	5.50E+00	1.60E-04	B				5.70E-04	B			

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III where applicable

a Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corp. (1998, *Final Background Metals Survey Report, Fort McClellan, Alabama.* July.

b Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000). *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

c Refer to Appendix B for a comprehensive list of all analytes that were analyzed for, including lead.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/kg - Milligrams per kilogram

NA - Not available

ND - not detected

Qual - Data validation qualifier

Table 2-11

Surface Water Analytical Results
Range 24A Multi-Purpose Range, Parcel 108(7)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Parcel Sample Location Sample Number Sample Date			Site [b] Specific Screening Levels	Ecological [b] Screening Values	FTA-108-SW/SD01 FTA-108 FT2001 29-Sep-99					FTA-108-SW/SD02 FTA-108 FT2002 01-Oct-99					FTA-108-SW/SD03 FTA-108 FT2003 30-Sep-99				
Parameter [c]	Units	BKG [a]	SSSL	ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/L	5.26E+00	1.53E+01	8.70E-02	2.11E-01	B			YES	1.18E-01	B			YES	1.46E-01	B			YES
Barium	mg/L	7.53E-02	1.10E+00	3.90E-03	2.14E-02	J			YES	1.85E-02	J			YES	2.80E-02	J			YES
Calcium	mg/L	2.52E+01		1.16E+02	1.37E+00	J				2.94E-01	J				1.83E+00	J			
Iron	mg/L	1.96E+01	4.70E+00	1.00E+00	2.60E-01	J				1.46E-01	J				1.40E-01				
Magnesium	mg/L	1.10E+01		8.20E+01	8.33E-01	J				3.41E-01	J				1.19E+00	J			
Manganese	mg/L	5.65E-01	6.40E-01	8.00E-02	9.60E-03	J				8.20E-03	J				5.80E-03	J			
Mercury	mg/L		4.25E-03	1.00E-05	6.30E-05	J			YES	6.30E-05	J			YES	ND				
Potassium	mg/L	2.56E+00		5.30E+01	1.98E+00	J				1.40E+00	J				1.84E+00	J			
Sodium	mg/L	3.44E+00		6.80E+02	1.31E+00	J				1.48E+00	J				1.23E+00	J			
Thallium	mg/L	2.40E-03	1.01E-03	4.00E-03	5.00E-03	B	YES	YES	YES	ND					4.90E-03	B	YES	YES	YES
Zinc	mg/L	4.03E-02	4.65E+00	5.89E-02	2.40E-03	B				2.70E-03	B				2.50E-03	B			
VOLATILE ORGANIC COMPOUNDS																			
Chloromethane	mg/L		8.23E-02	5.50E+00	1.30E-04	B				ND					ND				

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III where applicable

a Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corp. (1998, *Final Background Metals Survey Report, Fort McClellan, Alabama.* July.)

b Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000). Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama, July.

c Refer to Appendix B for a comprehensive list of all analytes that were analyzed for, including lead.

ESV - Ecological Screening Value

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/kg - Milligrams per kilogram

NA - Not available

ND - not detected

Qual - Data validation qualifier

Table 2-12

Sediment Analytical Results
Range 24A Fog Oil Drum Storage, Parcel 88(6)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q,and 214Q
Fort McClellan, Calhoun County, Alabama

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)			Site [b] Specific Screening Levels	Ecological [b] Screening Values	FTA-88-SW/SD01 FTA-88 FR1001 29-Sep-99 0- .5					FTA-88-SW/SD02 FTA-88 FR1002 29-Sep-99 0- .5				
Parameter	**Units**	**BKG [a]**	**SSSL**	**ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
METALS														
Aluminum	mg/kg	8.59E+03	1.15E+06		9.25E+03		YES			5.97E+03				
Arsenic	mg/kg	1.13E+01	5.58E+01	7.24E+00	6.70E+00					4.70E+00				
Barium	mg/kg	9.89E+01	8.36E+04		6.93E+01	J				4.13E+01				
Beryllium	mg/kg	9.70E-01	1.50E+02		1.10E+00	J	YES			7.00E-01				
Calcium	mg/kg	1.11E+03			1.68E+03	J	YES			1.03E+04		YES		
Chromium	mg/kg	3.12E+01	2.79E+03	5.23E+01	1.34E+01					1.58E+01				
Cobalt	mg/kg	1.10E+01	6.72E+04	5.00E+01	ND					4.40E+00	J			
Copper	mg/kg	1.71E+01	4.74E+04	1.87E+01	1.40E+01					2.31E+01		YES		YES
Iron	mg/kg	3.53E+04	3.59E+05		1.91E+04					2.59E+04				
Lead	mg/kg	3.78E+01	4.00E+02	3.02E+01	2.25E+01					1.27E+01				
Magnesium	mg/kg	9.06E+02			4.51E+02	J				5.21E+03		YES		
Manganese	mg/kg	7.12E+02	4.38E+04		2.93E+02					4.87E+02				
Mercury	mg/kg	1.10E-01	2.99E+02	1.30E-01	2.10E-01		YES		YES	4.40E-02	B			
Nickel	mg/kg	1.30E+01	1.76E+04	1.59E+01	ND					7.60E+00				
Potassium	mg/kg	1.01E+03			1.36E+03	J	YES			5.75E+02	J			
Sodium	mg/kg	6.92E+02			2.27E+02	J				6.26E+01	B			
Vanadium	mg/kg	4.09E+01	4.83E+03		1.84E+01	J				2.37E+01				
Zinc	mg/kg	5.27E+01	3.44E+05	1.24E+02	5.71E+01		YES			1.86E+02		YES		YES
SEMIVOLATILE ORGANIC COMPOUNDS														
Acenaphthylene	mg/kg		5.59E+04	3.30E-01	ND					4.10E-02	J			
Anthracene	mg/kg		2.99E+05	3.30E-01	ND					6.50E-02	J			
Benzo(a)anthracene	mg/kg		8.93E+01	3.30E-01	ND					2.20E-01	J			
Benzo(a)pyrene	mg/kg		8.93E+00	3.30E-01	ND					1.70E-01	J			
Benzo(b)fluoranthene	mg/kg		8.93E+01	6.55E-01	ND					2.40E-01	J			
Benzo(ghi)perylene	mg/kg		2.79E+04	6.55E-01	ND					1.20E-01	J			
Benzo(k)fluoranthene	mg/kg		8.93E+02	6.55E-01	ND					2.10E-01	J			
Chrysene	mg/kg		9.79E+03	3.30E-01	ND					4.20E-01				YES
Dibenz(a,h)anthracene	mg/kg		9.79E+00	3.30E-01	ND					5.00E-02	J			
Fluoranthene	mg/kg		3.73E+04	3.30E-01	ND					3.00E-01	J			
Indeno(1,2,3-cd)pyrene	mg/kg		8.93E+01	6.55E-01	ND					1.10E-01	J			
Phenanthrene	mg/kg		2.79E+05	3.30E-01	ND					6.70E-02	J			
Pyrene	mg/kg		3.06E+04	3.30E-01	ND					3.10E-01	J			
bis(2-Ethylhexyl)phthalate	mg/kg		5.41E+03	1.82E-01	ND					8.00E-02	B			
VOLATILE ORGANIC COMPOUNDS														
2-Butanone	mg/kg		6.23E+05	1.37E-01	3.20E-02	J				ND				
Acetone	mg/kg		1.03E+05	4.53E-01	1.80E-01	J				ND				
Methylene chloride	mg/kg		9.84E+03	1.26E+00	2.30E-01	J				2.50E-02	B			

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III where applicable

a Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corp. (1998, *Final Background Metals Survey Report, Fort McClellan, Alabama.* July.)

b Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000). *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/kg - Milligrams per kilogram

NA - Not available

ND - not detected

Qual - Data validation qualifier

Table 2-13

Sediment Analytical Results
Range 24A Multi-Purpose Range, Parcel 108(7)
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)			Site [b] Specific Screening Levels	Ecological [b] Screening Values	FTA-108-SW/SD01 FTA-108 FT1001 29-Sep-99 0- .5					FTA-108-SW/SD02 FTA-108 FT1002 01-Oct-99 0- .25					FTA-108-SW/SD03 FTA-108 FT1003 30-Sep-99 0- 0				
Parameter	**Units**	**BKG [a]**	**SSSL**	**ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
METALS																			
Aluminum	mg/kg	8.59E+03	1.15E+06		5.56E+03					9.66E+03		YES			8.61E+03		YES		
Arsenic	mg/kg	1.13E+01	5.58E+01	7.24E+00	4.30E+00					9.20E+00				YES	3.80E+00				
Barium	mg/kg	9.89E+01	8.36E+04		1.09E+02		YES			1.02E+02		YES			1.26E+02		YES		
Beryllium	mg/kg	9.70E-01	1.50E+02		8.90E-01					2.40E+00		YES			1.20E+00		YES		
Calcium	mg/kg	1.11E+03			1.84E+02	J				1.80E+02	J				6.47E+02	J			
Chromium	mg/kg	3.12E+01	2.79E+03	5.23E+01	8.00E+00					2.49E+01					1.70E+01				
Cobalt	mg/kg	1.10E+01	6.72E+04	5.00E+01	9.40E+00					1.11E+01		YES			5.40E+00	J			
Copper	mg/kg	1.71E+01	4.74E+04	1.87E+01	1.64E+01					1.34E+01					1.42E+01				
Iron	mg/kg	3.53E+04	3.59E+05		2.68E+04					7.44E+04		YES			2.27E+04				
Lead	mg/kg	3.78E+01	4.00E+02	3.02E+01	2.48E+01					1.57E+01					3.48E+01				YES
Magnesium	mg/kg	9.06E+02			4.49E+02	J				5.47E+02	J				5.22E+02	J			
Manganese	mg/kg	7.12E+02	4.38E+04		6.17E+02					3.96E+02					6.86E+01				
Mercury	mg/kg	1.10E-01	2.99E+02	1.30E-01	5.80E-02	B				4.00E-02	B				6.90E-02	B			
Nickel	mg/kg	1.30E+01	1.76E+04	1.59E+01	9.70E+00					2.77E+01		YES		YES	8.80E+00				
Potassium	mg/kg	1.01E+03			2.16E+03		YES			3.41E+03		YES			2.11E+03		YES		
Selenium	mg/kg	7.20E-01	5.96E+03		5.20E-01	J				1.00E+00		YES			ND				
Sodium	mg/kg	6.92E+02			6.30E+01	B				6.84E+01	B				9.17E+01	B			
Thallium	mg/kg	1.30E-01	7.78E+01		1.20E+00	J	YES			ND					ND				
Vanadium	mg/kg	4.09E+01	4.83E+03		1.23E+01					2.41E+01					2.09E+01				
Zinc	mg/kg	5.27E+01	3.44E+05	1.24E+02	3.24E+01	J				4.44E+01	J				8.13E+01	J	YES		
SEMIVOLATILE ORGANIC COMPOUNDS																			
Anthracene	mg/kg		2.99E+05	3.30E-01	6.80E-02	J				ND					ND				
Benzo(a)anthracene	mg/kg		8.93E+01	3.30E-01	9.90E-01				YES	ND					ND				
Benzo(a)pyrene	mg/kg		8.93E+00	3.30E-01	3.40E-01	J			YES	ND					ND				
Benzo(b)fluoranthene	mg/kg		8.93E+01	6.55E-01	6.80E-01	J			YES	ND					ND				
Benzo(ghi)perylene	mg/kg		2.79E+04	6.55E-01	1.00E-01	J				ND					ND				
Benzo(k)fluoranthene	mg/kg		8.93E+02	6.55E-01	5.80E-01					ND					ND				
Chrysene	mg/kg		9.79E+03	3.30E-01	9.80E-01				YES	ND					ND				
Di-n-butyl phthalate	mg/kg		1.14E+05	1.11E-01	ND					ND					1.90E-01	J			YES
Dibenz(a,h)anthracene	mg/kg		9.79E+00	3.30E-01	6.60E-02	J				ND					ND				
Fluoranthene	mg/kg		3.73E+04	3.30E-01	1.50E+00				YES	ND					ND				
Indeno(1,2,3-cd)pyrene	mg/kg		8.93E+01	6.55E-01	1.20E-01	J				ND					ND				
Pyrene	mg/kg		3.06E+04	3.30E-01	2.00E+00				YES	ND					ND				
bis(2-Ethylhexyl)phthalate	mg/kg		5.41E+03	1.82E-01	7.90E-02	B				1.50E-01	B				2.30E-01	B			YES
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/kg		1.03E+05	4.53E-01	3.70E-02	J				1.70E-02	B				6.40E-02	J			
Methylene chloride	mg/kg		9.84E+03	1.26E+00	2.90E-02	B				5.90E-03	B				7.10E-03	B			
Toluene	mg/kg		2.11E+05	6.70E-01	1.10E-03	J				4.10E-03	J				ND				
p-Cymene	mg/kg		2.08E+05		1.30E-02					2.40E-02					ND				

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III where applicable

a Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corp. (1998, *Final Background Metals Survey Report, Fort McClellan, Alabama.* July.)

b Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000). Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/kg - Milligrams per kilogram

NA - Not available

ND - not detected

Qual - Data validation qualifier

determine which analytical method was likely to return the more accurate result. This evaluation was conducted for naphthalene for which results were reported from both methods.

The following sections and Tables 2-4 through 2-13 summarize the results of the comparison of detected constituents to the SSSLs, ESVs, and background screening values. Complete analytical results are presented in Appendix B.

2.3.1 Surface and Depositional Soil Sample Results

Fourteen surface soil samples and five depositional soil samples were collected for chemical analyses at Parcels 88(6) and 108(7). Surface and depositional soil samples were collected from the upper 1 foot of soil at the locations shown on Figure 2-2. Analytical results were compared to residential human health SSSLs, ESVs, and metals background screening values, as presented in Tables 2-4 and 2-5. Surface and depositional soil sample locations with compounds exceeding SSSLs (background concentrations and SSSLs for metals) are shown on Figure 2-3.

Metals. Twenty metals, including aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, thallium, vanadium, and zinc were detected in surface and depositional soils at Parcels 88(6) and 108(7).

The concentrations of aluminum (FTA-108-GP01), chromium and iron (FTA-88-GP01), exceeded residential human health SSSLs and background concentrations.

The following metals were detected at concentrations exceeding ESVs and background concentrations: aluminum (one location), barium (one location), chromium (one location), copper (three locations), iron (one location), lead (four locations), mercury (one location), selenium (five locations), zinc (four locations), and beryllium.

Volatile Organic Compounds. Twelve VOCs, including 1,2,4-trimethylbenzene, 2-butanone, acetone, bromomethane, ethyl benzene, methylene chloride, styrene, toluene, trichlorofluoromethane, cis-1,2-dichloroethene, p-cymene, and naphthalene, were detected in surface and depositional soil samples collected at Parcels 88(6) and 108(7). The results were flagged with either a “J” data qualifier indicating that the result was greater than the method detection limit (MDL) but less than the specified RL, or a “B” qualifier signifying that the compound was also detected in an associated laboratory or field blank.

None of the detected VOCs at Parcels 88(6) and 108(7) was present at a concentration exceeding residential human health SSSLs or ESVs.

Semivolatile Organic Compounds. Two SVOCs, (butyl benzyl phthalate and bis[2-ethylhexyl]phthalate) were detected in surface and depositional soil samples collected at Parcels 88(6) and 108(7). The results were flagged with a "J" or "B" qualifier signifying that the compounds were also detected in an associated laboratory or field blank. The butyl benzyl phthalate and bis(2-ethylhexyl)phthalate concentrations were below residential human health SSSLs and ESVs.

Pesticides. Three pesticides, including 4,4'-dichlorodiphenyldichloroethene, endrin aldehyde, and endrin ketone, were detected in surface and depositional soil samples collected at Parcels 88(6) and 108(7). Each compound was detected in only one sample; 4,4'-dichlorodiphenyldichloroethene in FTA-108-GP07, and endrin aldehyde and endrin ketone in FTA-108-DEP03.

None of the results exceeded residential human health SSSLs or ESVs.

2.3.2 Subsurface Soil Sample Results

Fourteen subsurface soil samples were collected for chemical analyses at Parcels 88(6) and 108(7). Subsurface soil samples were collected at depths greater than 1-foot bgs at the locations shown on Figure 2-2. Analytical results were compared to residential human health SSSLs and metals background screening values, as presented in Tables 2-6 and 2-7. Subsurface soil sample locations with compounds exceeding SSSLs (background concentrations and SSSLs for metals) are shown on Figure 2-3. Pesticides were not detected in subsurface soil samples collected at Parcels 88(6) and 108(7).

Metals. Twenty metals, including aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, thallium, vanadium, and zinc, were detected in subsurface soil samples from Parcels 88(6) and 108(7).

Aluminum, arsenic, iron, and manganese concentrations exceeded residential human health SSSLs; however, of these metals, only aluminum and iron concentrations exceeded background concentrations.

Volatile Organic Compounds. Seven VOCs, including 2-butanone, acetone, bromomethane, methylene chloride, styrene, toluene, and trichlorofluoromethane, were detected in subsurface soil samples collected at Parcels 88(6) and 108(7). The results were flagged with either a "J" data qualifier indicating that the result was greater than the MDL but less than the specified RL, or a "B" qualifier signifying that the compound was also detected in an associated laboratory or field blank.

None of the detected VOCs was present at a concentration exceeding residential human health SSSLs.

Semivolatile Organic Compounds. Two SVOCs (diethyl phthalate and bis[2-ethylhexyl]phthalate) were detected in subsurface soil samples collected at Parcels 88(6) and 108(7). The results were flagged with either a "J" data qualifier indicating that the result was greater than the MDL but less than the specified RL, or a "B" qualifier signifying that the compound was also detected in an associated laboratory or field blank.

None of the detected SVOCs was present at a concentration exceeding residential human health SSSLs.

2.3.3 Groundwater Sample Results

Four existing and fourteen permanent monitoring wells installed by IT were sampled at Parcels 88(6) and 108(7). The monitoring well/groundwater sampling locations are shown on Figure 2-2. Analytical results were compared to residential human health SSSLs and metals background screening values, as presented in Tables 2-8 and 2-9. Groundwater sample locations with compounds exceeding SSSLs (background concentrations and SSSLs for metals) are shown on Figure 2-4.

Metals. Nineteen metals, including aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, sodium, thallium, vanadium, and zinc, were detected in unfiltered groundwater samples collected at Parcels 88(6) and 108(7).

The concentrations of 11 metals, including aluminum, arsenic, barium, beryllium, cobalt, copper, iron, lead, manganese, thallium, and vanadium, exceeded residential human health SSSLs and background concentrations. However, the majority of the detected metals exceeding SSSLs and background concentrations were present in 2 samples that had high turbidity readings at the time of sample collection. Sample location FTA-108-GP05 (turbidity greater than 1,000 nepthelometric turbidity units) contained all of the 11 detected metals exceeding SSSLs and background concentrations, and sample location FTA-108-GP08 (turbidity greater than 280 nephelometric turbidity units) contained 6 of the 11 detected metals exceeding SSSLs and background concentrations).

Volatile Organic Compounds. A total of 19 VOCs were detected in 12 of the 18 groundwater samples collected at Parcels 88(6) and 108(7). The benzene concentration (0.28 milligram per liter [mg/L]) at sample location FTA-108-T24A-G01 (formerly designated T24A-G01) exceeded the residential human SSSL (0.0014 mg/L). The 1,2,4-trimethylbenzene concentration (0.0072 mg/L) at sample location FTA-88-GP01 slightly exceeded the residential human health SSSL (0.006 mg/L).

Naphthalene, quantified as both a VOC and a SVOC, was detected (0.00015 mg/L) in the VOC sample results from FTA-88-GP02. The naphthalene result and nearly all of the remaining VOC compounds detected (with the exception of p-cymene at three locations, toluene at one location, and chloroform at one location) were flagged with either a “J” data qualifier or a “B” qualifier. The “J” data qualifier indicates that the result was greater than the MDL but less than the specified RL, and the “B” data qualifier indicates that the compound was also detected in an associated laboratory or field blank.

Semivolatile Organic Compounds. Seven SVOCs, including 1,2-dichlorobenzene, 4-methylphenol, di-n-butyl phthalate, di-n-octyl phthalate, phenol, naphthalene, and bis(2-ethylhexyl)phthalate, were detected in groundwater samples collected at Parcels 88(6) and 108(7). Naphthalene, quantified as both a VOC and a SVOC, was detected (0.001 mg/L) in the SVOC sample results from FTA-88-GP01.

The concentrations of 4-methylphenol (two locations) and di-n-octylphthalate (one location) exceeded the residential human health SSSLs.

Pesticides. The pesticide beta-BHC was detected in two of the groundwater samples collected at Parcels 88(6) and 108(7). Each of the results was flagged with a "J" data qualifier indicating that the result was greater than the MDL but less than the specified RL.

The beta-BHC results were below the residential human health SSSL.

2.3.4 Surface Water Sample Results

Five surface water samples were collected at Parcels 88(6) and 108(7) at the locations shown on Figure 2-2. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background screening values, as presented in Tables 2-10 and 2-11. Surface water sample locations with compounds exceeding SSSLs (background concentrations and SSSLs for metals) are shown on Figure 2-4.

Metals. Fourteen metals were detected in unfiltered surface water samples collected at Parcels 88(6) and 108(7). Thallium was present in three samples at concentrations exceeding human health SSSLs and background concentrations; however, the thallium results were flagged with a "B" signifying that the compound was also detected in the associated laboratory blank. Thallium (three locations) and chromium (one location) were present at concentrations exceeding ESVs and background concentrations.

Volatile Organic Compounds. Acetone and chloromethane were detected in surface water samples collected at Parcels 88(6) and 108(7). Each of the results was flagged with a "B" data qualifier signifying that these compounds were also detected in an associated laboratory or field blank.

None of the detected VOCs was present at a concentration exceeding human health SSSLs or ESVs.

2.3.5 Sediment Sample Results

Five sediment samples were collected at Parcels 88(6) and 108(7) at the locations shown on Figure 2-2. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background screening values, as presented in Tables 2-12 and 2-13. Sediment sample locations with compounds exceeding SSSLs (background concentrations and SSSLs for metals) are shown on Figure 2-4.

Metals. Twenty metals, including aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, thallium, vanadium, and zinc, were detected in sediment samples collected at Parcels 88(6) and 108(7).

None of the detected metals was present at a concentration exceeding human health SSSLs. The concentrations of copper, mercury, nickel, and zinc exceeded ESVs and background concentrations at one location each.

Volatile Organic Compounds. Five VOCs, including 2-butanone, acetone, methylene chloride, toluene, and p-cymene were detected in sediment samples collected at Parcels 88(6) and 108(7). The 2-butanone, acetone, methylene chloride, and toluene results were flagged with either a "J" data qualifier or a "B" qualifier. The "J" data qualifier indicates that the result was greater than the MDL but less than the specified RL, and the "B" data qualifier indicates that the compound was also detected in an associated laboratory or field blank.

None of the detected VOCs was present at a concentration exceeding human health SSSLs or ESVs.

Semivolatile Organic Compounds. Fifteen SVOCs, including acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, di-n-butyl phthalate, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene, were detected in sediment samples collected at Parcels 88(6) and 108(7). The bis(2-ethylhexyl)phthalate results were flagged with a "B" data qualifier signifying that this compound were also detected in an associated laboratory or field blank.

None of the detected SVOCs was present at a concentration exceeding human health SSSLs. The concentration of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate (one location each); chrysene (two locations); and di-n-butyl phthalate, fluoranthene, and pyrene (one location each) exceeded ESVs, however, the bis(2-ethylhexyl)phthalate and di-n-butyl phthalate results were flagged with a "B" data qualifier indicating that these compounds were also detected in an associated laboratory or field blank.

3.0 Site-Specific Data Quality Objectives

3.1 Overview

The data quality objective (DQO) process is followed to establish data requirements. This process ensures that the proper quantity and quality of data are generated to support the decision-making process associated with the future action for the Ranges Near Training Area T-24A site. This section incorporates the components of the DQO process described in the publication EPA 540-R-93-071 *Data Quality Objectives Process for Superfund* (EPA, 1993). The DQO process as applied to the Ranges Near Training Area T-24A is described in more detail in Section 4.3 of the WP. Table 3-1 provides a summary of the factors used to determine the appropriate quantity of samples, and the procedures necessary to meet the objectives of the supplemental RI and establish a basis for future action at this site.

The supplemental RI water and soil matrix samples will be analyzed using EPA SW-846 Methods, including Update III methods where applicable, as presented in Chapter 4.0 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah (CESAS) Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard copy data packages by the laboratory using Contract Laboratory Program (CLP)-like forms. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

3.2 Data Users and Available Data

The intended data users and available data related to the supplemental RI SFSP at the Ranges Near Training Area T-24A, presented in Table 3-1, have been used to formulate a site-specific conceptual model. Analytical data collected during SI activities at Parcels 88(6) and 108(7 will be included in the conceptual model. This conceptual model was developed to support the development of this supplemental RI SFSP, which is necessary to meet the objectives of these activities and to establish a basis for future action at the site. The data users for information generated during field activities are primarily EPA, USACE, ADEM, FTMC, and the USACE supporting contractors. This supplemental RI SFSP, along with the necessary companion documents, has been designed to provide the regulatory agencies with sufficient detail to reach a determination as to the adequacy of the scope of work. The program has also been designed to provide defensible information required to confirm or deny the existence and nature of residual chemical contamination in site media.

Table 3-1

Summary of Data Quality Objectives
Ranges near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Potential Data Users	Available Data	Conceptual Site Model	Media of Concern	Data Uses and Objectives	Data Types	Analytical Level	Data Quantity
EPA ADEM USACE DOD IT Corporation Other Contractors Possible future land users	SAIC, Site Investigation Report, 1993 SAIC, Remedial Investigation Report, 1995 ESE, 1998 EPA, 1983 SAIC, Remedial Investigation/ Baseline Risk Assessment Report, 1999 IT, Site Investigations Parcels 108(7) and 88(6), 1999	<u>Contaminant Source</u> Decontaminating agents used on CWA. Toxic agents and munitions <u>Migration Pathways</u> Infiltration and leaching to subsurface soil and groundwater. Biotransfer to venison Dust emissions and volatilization from soil to ambient air. Surfacewater runoff Erosion and runoff from soil to surface water and sediment <u>Potential Receptors</u> Groundskeeper (current and future) Construction Worker (future) Resident (future) Recreational Site User (current and future) <u>PSSC</u> decontaminating chemicals metals munitions	Surface Soil Subsurface Soil Groundwater Surface Water Sediment Depositional Soil	Obtain sufficient data to support, as appropriate, the following: - Implementing an immediate response. - No further action. - Proceeding with an remedial action. RI to determine the nature and extent of contamination in the site media.	<u>Surface Soil</u> TCL-SVOCs Metals Explosives	Definitive data in CESAS Level B data packages	29 surface soil samples +QC 14 existing from SIs at 108(7) and 88(6), IT, 1999
					<u>Subsurface Soil</u> TCL-VOCs TCL-SVOCs Metals Agent Breakdown Products Explosives	Definitive data in CESAS Level B data packages	8 subsurface soil samples (5 residuum monitoring well boreholes)+QC 14 existing from SIs at 108(7) and 88(6), IT, 1999
					<u>Groundwater</u> TCL-VOCs TCL-SVOCs Metals Agent Breakdown Products Explosives	Definitive data in CESAS Level B data packages	37 monitoring wells + QC (15 proposed wells,18 existing wells)
					<u>Surface Water</u> TCL VOCs TCL-SVOCs Metals Agent Breakdown Products Explosives	Definitive data in CESAS Level B data packages	4 surface water samples + QC + 5 surface water samples + QC (From SIs at 108(7) and 88(6)
					<u>Sediment</u> TCL VOCs TCL-SVOCs Metals Agent Breakdown Products Explosives TOC, Grain Size	Definitive data in CESAS Level B data packages	4 sediment samples + QC + 5 sediment samples + QC (From SIs at 108(7) and 88(6)
					<u>Depositional Soil</u> TCL VOCs TCL-SVOCs Metals Agent Breakdown Products Explosives	Definitive data in CESAS Level B data packages	5 depositional samples + QC (From SIs at 108(7) and 88(6)

ADEM - Alabama Department of Environmental Management.
CESAS - Corps of Engineers South Atlantic Savannah.
CWM - Chemical warfare materiels.
DOD - U.S. Department of Defense.
ESE - Environmental Science and Engineering.
PSSC - Potential site-specific chemicals.
QC - Quality control.
RI - Remedial investigation.
SAIC - Science Application International Corporation.
TCL - Target compound list.
USACE - U.S. Army Corps of Engineers.
VOC - Volatile organic compound.
SVOC - Semi-volatile organic compound.
EPA - U.S. Environmental Protection Agency.

3.3 Conceptual Site Exposure Model

The conceptual site exposure model (CSEM) provides the basis for identifying and evaluating the potential risks and hazards to human health in the risk assessment. The CSEM includes receptors and potential exposure pathways appropriate to all plausible scenarios. The CSEM facilitates consistent and comprehensive evaluation of human health through graphically presenting all possible exposure pathways, including sources, release and transport pathways, and exposure routes. In addition, the CSEM helps to ensure that potential pathways are not overlooked. The elements of a complete exposure pathway and CSEM are:

- Source (i.e., contaminated environmental) media
- Contaminant release mechanisms
- Contaminant transport pathways
- Receptors
- Exposure pathways.

Contaminant release mechanisms and transport pathways are not relevant for direct receptor contact with a contaminated source medium.

Primary contaminant releases were probably limited to leaks and spills that entered surface soil, and potentially buried materials. Potential contaminant transport pathways include infiltration to subsurface soil, infiltration and leaching to groundwater, discharge of groundwater to surface water, erosion and runoff to surface water and sediment, dust emissions and volatilization to ambient air from surface soil, and biotransfer to deer through browsing.

3.3.1 Current Land Use

The Ranges Near Training Area T-24A are not currently utilized. A groundskeeper does maintain the road through the site. For the current land-use scenario, the recreational site user is evaluated in addition to the groundskeeper because it is possible that a trespasser could circumvent security measures at the base perimeter and wander into this area. Exposure to fish and venison will not be evaluated for the recreational site user because the stream that transects the site is not large enough to sustain any sizeable fish population, and the restricted access of the site would discourage hunting. Other potential receptors considered, but not included under current land-use scenarios, are the:

- Construction worker: The site is unused, and no development or construction is occurring or scheduled.

- Resident: The site is not currently used for residential purposes.

3.3.2 Future Land Use

Future land-use in this area is expected to be a remediation reserve (FTMC, 1997). The site may not be deemed safe for public access until remediation has been completed because of the potential for UXO (FTMC, 1997). Plausible future land-use receptor scenarios addressed in the CSEM include:

- ***Resident.*** Although the site is expected to be used as open space and not be developed, the resident is considered in order to provide information for the project manager and regulators.
- ***Groundskeeper.*** The site is likely to have areas that will need to be maintained in the future.
- ***Construction Worker.*** Although the site is not expected to be developed in the near future, construction/demolition or maintenance of buried utilities may occur at some point in the future, thus this receptor is evaluated.
- ***Recreational Site User.*** The site is planned for recreational use once the remediation is completed. Deer hunting is a potential future exposure pathway for the recreational site user.

A summary of relevant contaminant release and transport mechanisms, source and exposure media, and receptors and exposure pathways for this site is provided in Table 3-1 and Figure 3-1.

3.3.3 Decision-Making Process, Data Uses, and Needs

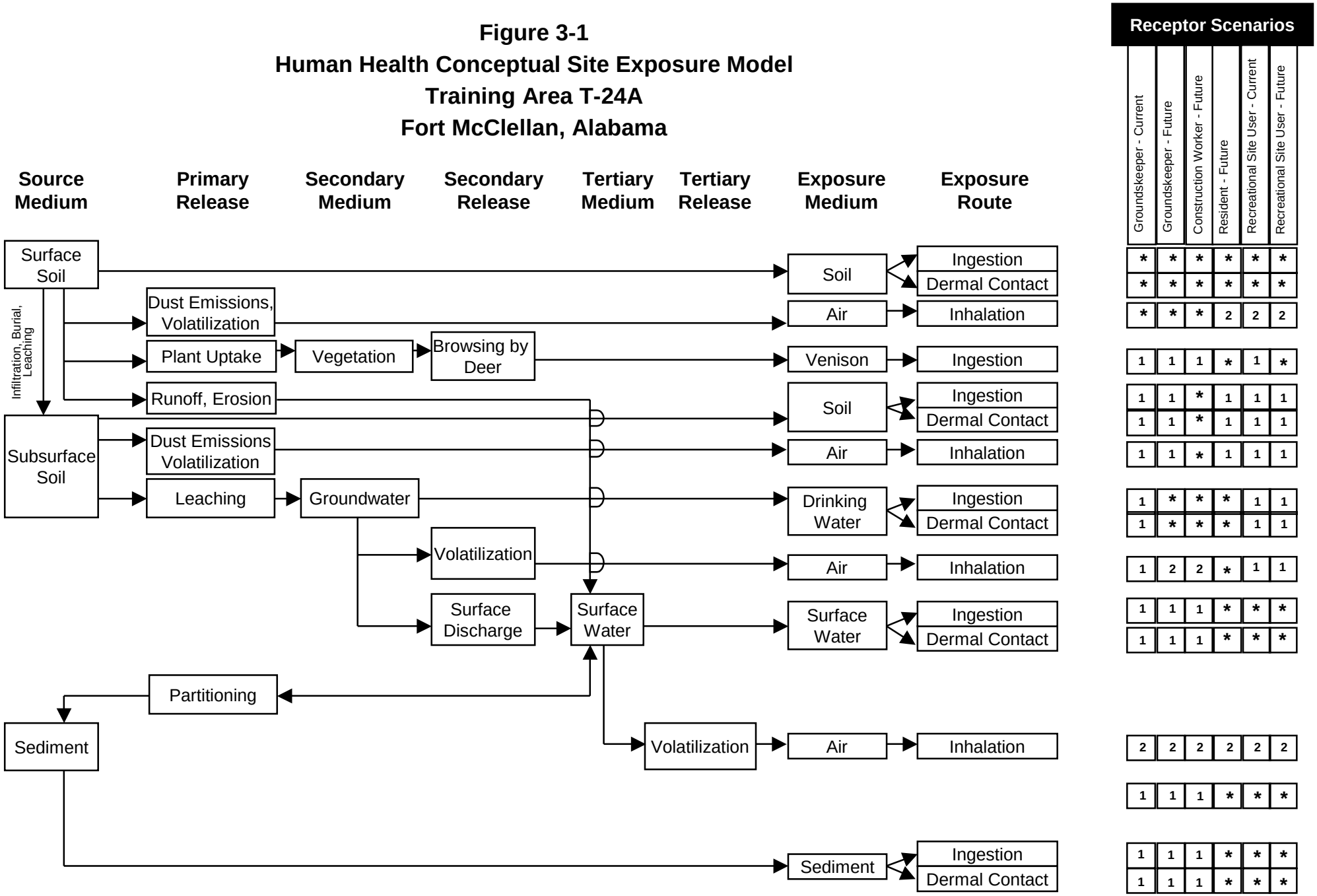
The decision-making process consists of a seven-step process that is presented in detail in Sections 3.2 and 4.3 of the WP and will be followed during the supplemental RI at the Ranges Near Training Area T-24A site. Data uses and needs are summarized in Table 3-1.

3.3.4 Risk Evaluation

Confirmation of contamination at the Ranges Near Training Area T-24A site will be based upon a comparison of detected site contaminants to the most current guidance criteria. The data will be reported and evaluated using EPA definitive data with CESAS Level B criteria. Data packages will contain RLs sufficient to determine whether the established guidance criteria are exceeded in site media. Definitive data will be adequate for confirming the presence of site contamination and for supporting additional decision-making steps, such as remedial action and risk assessment, if necessary.

3.3.5 Data Types and Quality

Figure 3-1
Human Health Conceptual Site Exposure Model
Training Area T-24A
Fort McClellan, Alabama



* = Complete exposure pathway evaluated in the streamlined risk assessment.
1 = Incomplete exposure pathway.
2 = Although theoretically complete, this pathway is judged to be insignificant and is not evaluated in the streamlined risk assessment.

Surface soil, subsurface soil, and groundwater will be sampled and analyzed to meet the objectives of the supplemental RI for the Ranges Near Training Area T-24A site. In association with these definitive samples, quality assurance/quality control (QA/QC) samples will be collected for sample types as described in Chapter 4.0 of this SFSP.

Samples will be analyzed by EPA-approved SW-846 methods Update III, where available. Sample data will comply with EPA definitive data requirements and will be reported using hard copy data packages. In addition to meeting the quality needs of this supplemental RI SFSP, data analyzed at this level of quality are appropriate for all phases of site characterization, remedial investigation, and risk assessment.

3.3.6 Precision, Accuracy, and Completeness

Laboratory requirements for precision, accuracy, and completeness for this supplemental RI are provided in Chapter 9.0 of the QAP.

4.0 Field Investigations

This chapter describes the field activities that will be performed at Ranges Near Training Area T-24A, including UXO clearance and field sampling and analysis activities.

4.1 UXO Survey Requirements and Utility Clearance

The Ranges Near Training Area T-24A falls within the "Possible Explosive Ordnance Impact Area" shown on Plate 10 of the FTMC *Archive Search Report, Maps, Fort McClellan, Anniston, Alabama* (USACE, 1999). The presence of UXO and CWM is possible at the Ranges Near Training Area T-24A site. Therefore, IT will conduct UXO avoidance activities, including surface sweeps and downhole surveys of soil borings in addition to conducting utility clearances before installing soil borings. The site-specific UXO safety plan provides technical guidance for ordnance and explosives avoidance and construction activities for hazardous, toxic, and radiological waste investigations, sample collection, and analyses at the Ranges Near Training Area T-24A. The site-specific UXO safety plan attachment has been written in conjunction with Appendix E of the SAP (IT, 2000a). CWM surveys will be conducted by USACE, Huntsville, (Parsons Engineering Service, Inc. 1999).

4.1.1 Surface UXO Survey

A UXO sweep will be conducted over areas that will be included in the sampling and surveying activities to identify UXO on or near the surface that may present a hazard to on-site workers during field activities. Low-sensitivity magnetometers will be used to locate surface and shallow-buried metal objects. UXO located on the surface will be identified and conspicuously marked for easy avoidance. UXO personnel requirements, procedures, and detailed descriptions of the geophysical equipment to be used are provided in Chapter 4.0 and Appendices D and E of the approved SAP (IT, 2000a) site-specific UXO safety plan.

4.1.2 Downhole UXO Survey

During the soil boring and downhole sampling activities, a downhole UXO survey will be performed to determine if buried metallic objects are present. UXO monitoring, as described in Chapter 4.0 of the SAP (IT, 2000a), will continue until undisturbed soils are encountered or the borehole has been advanced to 12 feet bgs, whichever is reached first.

4.1.3 Utility Clearances

After the UXO surface survey has cleared the area to be sampled and prior to performing any intrusive sampling, a utility clearance will be performed at all locations where soil and groundwater samples will be collected, using the procedure outlined in Section 4.2.6 of the SAP. The site manager will mark the proposed locations with stakes, coordinate with the installation to clear the proposed locations for utilities, and obtain digging permits. Once the locations are approved (for both UXO and utility avoidance) for intrusive sampling, the stakes will be labeled as cleared.

4.2 Environmental Sampling

The environmental sampling program during the supplemental RI for the Ranges Near Training Area T-24A site includes the collection of surface soil samples and subsurface soil samples, and groundwater samples for chemical analyses. IT will evaluate data collected from the SIs at Parcels 88(6) and 108(7) in conjunction with data collected from the proposed sampling locations as part of this supplemental RI. The proposed sampling is intended to provide sufficient data to complete the supplemental RI; however, if potential contaminant sources within the fenced area of Parcel 187(7) and northwest of the fenced area of Parcel 187(7) (Figure 4-1) are identified during the chemical CWM investigation by Parsons Engineering Science, Inc., additional soil and groundwater samples may be collected. These additional samples will be tracked through project variance reports and reported in the supplemental RI report.

4.2.1 Surface Soil Sampling

Twenty-nine surface soil samples will be collected during the supplemental RI to determine if contaminants associated with firing range activities, fog oil use, and chemical warfare training activities are present.

4.2.1.1 Sample Locations and Rationale

The surface soil sampling rationale is listed in Table 4-1. Proposed sampling locations are shown on Figure 4-1. Surface soil sample designations and required QA/QC samples are summarized in Table 4-2. The proposed surface soil samples will be collected from eight monitoring well locations and twenty-one surface soil sample locations.

4.2.1.2 Sample Collection

Table 4-1

Site Sampling Rationale
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sampling Location Rationale
R24A-187-MW01	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW01 will be installed about 800 feet west of existing well FTA-108-T24A-G01. This location is hydraulically downgradient of FTA-88-GP01 which had trace concentrations of benzene detected in groundwater during the SI at Parcel 88(6). This location will provide definitive groundwater quality data to determine if trace concentrations of contaminants in FTA-88-GP01 are associated with contaminants in FTA-108-T24A-G01. Groundwater elevations will be used to establish horizontal and vertical groundwater flow directions. It is estimated that the monitoring well will be installed to a depth of approximately 45 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals
R24A-187-MW02	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW02 will be installed about 700 feet northwest of existing well FTA-108-T24A-G01. This location is also hydraulically downgradient of FTA-88-GP01. This location will provide definitive groundwater quality data to determine if trace concentrations of contaminants in FTA 88-GP01 are associated with contaminants in FTA-108-T24A-G01. Groundwater elevations will be used to establish horizontal and vertical groundwater flow directions. It is estimated that the monitoring well will be installed to a depth of approximately 30 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW03	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW03 will be installed about 500 feet northwest of existing well FTA-108-T24A-G01 on the east side of the north-south trending surface water tributary and splay fault trace to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It is estimated that the monitoring well will be installed to a depth of approximately 30 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW04	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW04 will be installed about 350 feet north of existing well FTA-108-T24A-G01 to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It is estimated that the monitoring well will be installed to a depth of approximately 45 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW05	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW05 will be installed about 300 feet northwest of existing well FTA-108-T24A-G01 on the east side of the north-south trending surface water tributary and the splay fault trace to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It is estimated that the monitoring well will be installed to a depth of approximately 30 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW06	GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW06 will be installed adjacent to FTA-108-T24A-G01 to provide definitive vertical groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It is estimated that the monitoring well will be installed to a depth of approximately 45 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW07	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW07 will be installed about 800 feet west of existing well FTA-108-T24A-G01 to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with residuum groundwater monitoring well R24A-187-MW01. This location is also hydraulically downgradient of FTA-88-GP01. This location will provide definitive groundwater quality data to determine if trace concentrations of contaminants in FTA-88-GP01 are associated with contaminants in FTA-108-T24A-G01. It is estimated that the monitoring well will be installed to a depth of approximately 90 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW08	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW08 will be installed about 700 feet northwest of existing well FTA-108-T24A-G01 to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with residuum groundwater monitoring well R24A-187-MW02. This location is also hydraulically downgradient of FTA-88-GP01. This location will provide definitive groundwater quality data to determine if trace concentrations of contaminants in FTA-88-GP01 are associated with contaminants in FTA-108-T24A-G01. It is estimated that the monitoring well will be installed to a depth of approximately 70 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW09	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW09 will be installed about 500 feet northwest of existing well FTA-108-T24A-G01 on the east side of the north-south trending surface water tributary and the splay fault trace to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with residuum groundwater monitoring well R24A-187-MW03. It is estimated that the monitoring well will be installed to a depth of approximately 75 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.

Table 4-1

Site Sampling Rationale
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sampling Location Rationale
R24A-187-MW10	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW10 will be installed about 350 feet north of existing well FTA-108-T24A-G01 to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with residuum groundwater monitoring well R24A-187-MW04. It is estimated that the monitoring well will be installed to a depth of approximately 110 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW11	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW11 will be installed about 300 feet northwest of existing well FTA-108-T24A-G01 on the east side of the north-south trending surface water tributary and the splay fault trace to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with residuum groundwater monitoring well R24A-187-MW05. It is estimated that the monitoring well will be installed to a depth of approximately 70 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW12	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW12 will be installed adjacent to FTA-108-T24A-G01 to provide definitive vertical groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will also be paired with residuum groundwater monitoring well R24A-187-MW06. It is estimated that the monitoring well will be installed to a depth of approximately 150 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW13	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW13 will be installed about 450 feet west of existing well FTA-108-T24A-G01 to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with residuum groundwater monitoring well FTA-108-GP05. It is estimated that the monitoring well will be installed to a depth of approximately 75 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW14	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW14 will be installed about 250 feet south-southwest of existing well FTA-108-T24A-G01 to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with existing residuum groundwater monitoring well FTA-108-T24A-G02. It is estimated that the monitoring well will be installed to a depth of approximately 100 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW15	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW15 will be installed about 400 feet southeast of existing well FTA-108-T24A-G01 to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with existing residuum groundwater monitoring well FTA-108-T24A-G03. It is estimated that the monitoring well will be installed to a depth of approximately 110 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW16	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW16 will be installed about 1400 feet northwest of existing well FTA-108-T24A-G01. This location is in the impact area of Parcel 214Q. This location will provide definitive groundwater quality data to determine if firing range activities have impacted groundwater in a northwestern location. Groundwater elevations will be used to establish horizontal and vertical groundwater flow directions. It is estimated that the monitoring well will be installed to a depth of approximately 35 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW17	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW17 will be installed about 1200 feet northwest of existing well FTA-108-T24A-G01. This location is in the impact area of Parcel 214Q. This location will provide definitive groundwater quality data to determine if tfiring range activities have impacted groundwater in a northwestern location. Groundwater elevations will be used to establish horizontal and vertical groundwater flow directions. It is estimated that the monitoring well will be installed to a depth of approximately 35 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW18	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW18 will be installed about 300 feet east north-east of existing well FTA-108-T24A-G01 to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with existing residuum groundwater monitoring well FTA-108-GP10. It is estimated that the monitoring well will be installed to a depth of approximately 110 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.

Table 4-1

Site Sampling Rationale
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sampling Location Rationale
R24A-187-MW19	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW19 will be installed about 500 feet east-southeast of existing well FTA-108-T24A-G01. This location is hydraulically upgradient of Parcel 113Q-X. It is estimated that the monitoring well will be installed to a depth of approximately 65 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-88-GP01	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 88(6) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-88-GP02	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 88(6) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-88-GP03	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 88(6) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-88-GP04	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 88(6) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP01	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP02	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP03	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP04	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP05	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP06	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP07	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP08	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP09	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP10	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.

Table 4-1

Site Sampling Rationale
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sampling Location Rationale
FTA-108-T24A-GP01	GROUNDWATER	Existing bedrock monitoring well associated with the SI at Parcel 187(7) and at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-T24A-GP02	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-T24A-GP03	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-BK-G06	GROUNDWATER	Existing residuum monitoring well associated with the background groundwater sampling and the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-GP01	SURFACE SOIL	Surface soil samples will be collected at a suspected impact area along a western facing slope within the firing fan of Parcel 214Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP02	SURFACE SOIL	Surface soil samples will be collected at a suspected impact area along a western facing slope within the firing fan of Parcel 214Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP03	SURFACE SOIL	Surface soil sample will be collected within a surface depression at a suspected impact area within the firing fan of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP04	SURFACE SOIL	Surface soil sample will be collected within a surface depression at a suspected impact area within the firing fan of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP05	SURFACE SOIL	Surface soil sample will be collected on a conical mound at a suspected target/impact area within the firing fan of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP06	SURFACE SOIL	Surface soil sample will be collected within a surface depression of a conical mound at a suspected target/impact area within the firing fan of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP07	SURFACE SOIL	Surface soil sample will be collected at the base of a conical mound at a suspected target/impact area within the firing fan of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP08	SURFACE SOIL	Surface soil sample will be collected within a linear surface depression (trench) at a suspected impact area within the firing fan of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP09	SURFACE SOIL	Surface soil sample will be collected within a linear surface depression (trench) at a suspected impact area within the firing fan of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP10	SURFACE SOIL	Surface soil sample will be collected within a linear surface depression (trench) at a suspected impact area within the firing fan of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP11	SURFACE SOIL	Surface soil samples will be collected at a suspected target/impact area on a linear mound within the firing fan of Parcel 112Q and potential where fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP12	SURFACE SOIL	Surface soil samples will be collected at a suspected target/impact area on a linear mound within the firing fan of Parcel 112Q and potential where fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.

Table 4-1

Site Sampling Rationale
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sampling Location Rationale
R24A-187-GP13	SURFACE SOIL	Surface soil samples will be collected at a suspected target/impact area on a linear mound within the firing fan of Parcel 112Q and potential where fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP14	SURFACE SOIL	Surface soil samples will be collected at a suspected impact area along a north-facing slope within the firing fan of Parcel 112Q and within Range 24A where fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP15	SURFACE SOIL	Surface soil samples will be collected at a suspected impact area along a north-facing slope within the firing fan of Parcel 112Q and within Range 24A where fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP16	SURFACE SOIL	Surface soil samples will be collected at a suspected impact area along a north-facing slope within the firing fan of Parcel 112Q and within Range 24A where fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP17	SURFACE SOIL	Surface soil samples will be collected at a suspected firing line of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP18	SURFACE SOIL	Surface soil samples will be collected at a suspected firing line of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP19	SURFACE SOIL	Surface soil samples will be collected at a suspected firing line of Parcel 214Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP20	SURFACE SOIL	Surface soil samples will be collected at a suspected firing line of Parcel 214Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP21	SURFACE SOIL	Surface soil samples will be collected northeast of Parcel 187(7) where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-SW/SD01	SURFACE WATER SEDIMENT	Surface water and sediment will be collected from surface drainage feature located approximately 125 ft northeast of PATA 100 BR C00 to determine the presence or absence of contamination from runoff flowing north from the topographic high south south of Parcel 112Q Surface water and sediment samples will be analyzed for TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD02	SURFACE WATER SEDIMENT	Surface water and sediment will be collected from the South Branch of Cane Creek northwest of potential impact area of Parcel 214Q to determine the presence of absence of contamination from runoff flowing northwest from the study area. Surface water and sediment samples will be analyzed for TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD03	SURFACE WATER SEDIMENT	Surface water and sediment will be collected from the confluence of the surface drainage feature and the South Branch of Cane Creek in the northwest corner of the study area near the impact area of Parcel 214Q to determine the presence or absence of contamination from runoff flowing north from the study area. Surface water and sediment samples will be analyzed for TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD04	SURFACE WATER SEDIMENT	Surface water and sediment will be collected from the surface drainage feature on the southwest corner of the study areaq near the firing line of Parcel 213Q to determine the presence or absence of contamination from runoff flowing north from the study area. Surface water and sediment samples will be analyzed for TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD05	SURFACE WATER SEDIMENT	Surface water and sediment will be collected from surface drainage feature located near the northeast corner of Parcel 113Q-X to determine the presence or absence of contamination from runoff flowing north. Surface water and sediment samples will be analyzed for TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)

Table 4-1

Site Sampling Rationale
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sampling Location Rationale
R24A-187-SW/SD06	SURFACE WATER SEDIMENT	Surface water and sediment will be collected from surface drainage feature located near the northcentral section of Parcel 113Q-X to determine the presence or absence of contamination from runoff flowing north from the study area. Surface water and sediment samples will be analyzed for TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD07	SURFACE WATER SEDIMENT	Surface water and sediment will be collected from surface drainage feature located approximately 175 ft northwest of Parcel 187(7) to determine the presence or absence of contamination from runoff flowing north from the study area. Surface water and sediment samples will be analyzed for TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)

Table 4-2

Surface and Subsurface Soil Sample Designations and QA/AC Sample Quantities
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
R24A-187-MW01	R24A-187-MW01-SS-JG0001-REG	0-1			R24A-187-MW01-SS-JG0001-MS/MSD	TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products; TCL VOCs (subsurface soil only)
	R24A-187-MW01-DS-JG0002-REG	a				
R24A-187-MW02	R24A-187-MW02-SS-JG0003-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products; TCL VOCs (subsurface soil only)
	R24A-187-MW02-DS-JG0004-REG	a				
R24A-187-MW03	R24A-187-MW03-SS-JG0005-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products; TCL VOCs (subsurface soil only)
	R24A-187-MW03-DS-JG0006-REG	a				
R24A-187-MW04	R24A-187-MW04-SS-JG0007-REG	0-1	R24A-187-MW04-SS-JG0008-FD	R24A-187-MW04-SS-JG0009-FS		TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products; TCL VOCs (subsurface soil only)
	R24A-187-MW04-DS-JG0010-REG	a				
R24A-187-MW05	R24A-187-MW05-SS-JG0011-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products; TCL VOCs
	R24A-187-MW05-DS-JG0012-REG	a				
R24A-187-MW16	R24A-187-MW16-SS-JG0013-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products; TCL VOCs (subsurface soil only)
	R24A-187-MW16-DS-JG0014-REG	a				
R24A-187-MW17	R24A-187-MW17-SS-JG0015-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products; TCL VOCs (subsurface soil only)
	R24A-187-MW17-DS-JG0016-REG	a				
R24A-187-MW19	R24A-187-MW19-SS-JG0017-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products; TCL VOCs (subsurface soil only)
	R24A-187-MW19-DS-JG0018-REG	a				
R24A-187-GP01	R24A-187-GP01-SS-JG0019-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP02	R24A-187-GP02-SS-JG0020-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP03	R24A-187-GP03-SS-JG0021-REG	0-1			R24A-187-GP03-SS-JG0021-MS/MSD	TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP04	R24A-187-GP04-SS-JG0022-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP05	R24A-187-GP05-SS-JG0023-REG	0-1	R24A-187-GP05-SS-JG0024-FD			TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products

Table 4-2

Surface and Subsurface Soil Sample Designations and QA/AC Sample Quantities
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
R24A-187-GP06	R24A-187-GP06-SS-JG0025-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP07	R24A-187-GP07-SS-JG0026-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP08	R24A-187-GP08-SS-JG0027-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP09	R24A-187-GP09-SS-JG0028-REG	0-1			R24A-187-GP09-SS-JG0028-MS/MSD	TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP10	R24A-187-GP10-SS-JG0029-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP11	R24A-187-GP11-SS-JG0030-REG	0-1	R24A-187-GP11-SS-JG0031-FD	R24A-187-GP11-SS-JG0032-FS		TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP12	R24A-187-GP12-SS-JG0033-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP13	R24A-187-GP13-SS-JG0034-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP14	R24A-187-GP14-SS-JG0035-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP15	R24A-187-GP15-SS-JG0036-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP16	R24A-187-GP16-SS-JG0037-REG	0-1			R24A-187-GP16-SS-JG0037-MS/MSD	TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP17	R24A-187-GP17-SS-JG0038-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP18	R24A-187-GP18-SS-JG0039-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP19	R24A-187-GP19-SS-JG0040-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP20	R24A-187-GP20-SS-JG0041-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM
R24A-187-GP21	R24A-187-GP21-SS-JG0042-REG	0-1	R24A-187-GP21-SS-JG0043-FD			TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products

Table 4-2

Surface and Subsurface Soil Sample Designations and QA/AC Sample Quantities
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

[a] Actual sample depth selected for analysis will be at the discretion of the site geologist and will be based on field observation.

FD - Field duplicate.
FS - Field split.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.
CWM- chemical warfare material

Surface soil samples will be collected from the upper 1 foot of soil by hand auger as specified in Section 4.9.1.1 of the SAP. Collected soil samples will be screened using a photoionization detector (PID) in accordance with Section 4.15 of the SAP. Surface soil samples will be screened for information purposes only, and not to select samples for analysis. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP. Sample documentation and chain-of-custody (COC) will be recorded as specified in Section 4.13 of the SAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.2 Subsurface Soil Sampling

Subsurface soil samples will be collected from eight monitoring well boreholes during the supplemental RI at the Ranges Near Training Area T-24A site. The soil sample from each boring exhibiting the highest reading on a PID will be sent to the laboratory for analysis. If none of the sample intervals indicate elevated PID readings, the deepest sample interval will be submitted to the laboratory.

4.2.2.1 Sample Locations and Rationale

Subsurface soil sampling rationale is presented in Table 4-1. A total of eight subsurface soil samples will be collected. Subsurface soil sample designations and required QA/QC samples are summarized in Table 4-2. The proposed subsurface soil sampling locations are presented on Figure 4-1.

4.2.2.2 Sample Collection

Subsurface soil samples will be collected using direct-push technology specified in Section 4.7.1.1 of the SAP.

Subsurface soil samples will be collected continuously to 12 feet bgs or refusal is reached at each of the proposed locations. A detailed lithological log of each borehole will be recorded by the on-site geologist. Samples from the entire length of the boring will be field screened using a PID. Samples will be collected for headspace screening as specified in Section 4.15 of the SAP. Typically, the soil sample from each boring exhibiting the highest reading on a PID (above background) will be sent to the laboratory for analysis. If none of the samples indicate readings exceeding background using the PID, the deepest sample interval will be submitted to the laboratory for analyses. Subsurface soil samples will be selected for analyses from any depth interval if the on-site geologist suspects potential site specific chemicals (PSSC) at the depth

interval. Site conditions such as lithology may also determine the actual sample depth interval submitted for analyses. More than one subsurface soil sample will be collected if field measurements and observations indicate a possible layer of PSSCs and/or additional sample data would provide insight to the existence of PSSCs. Subsurface soil sample designations, depths, and required QA/QC sample quantities are listed in Table 4-2.

Sample documentation and chain of custody will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this supplemental RI SFSP are listed in Chapter 5.0, Table 5-1 of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.3 Monitoring Well Installation

Nine residuum and ten bedrock monitoring wells are proposed at the Ranges Near Training Area T-24A. The monitoring wells will be installed using a combination of wireline coring, hollow-stem auger, and air-rotary drilling methods. The wells will be installed to provide information on water quality and groundwater flow in both the residuum and bedrock aquifers. Previous investigations by SAIC (1995) and IT indicate the presence of groundwater contamination in one bedrock monitoring well (T24A-G01, subsequently renamed FTA-108-T24A-G01 during the SIs at Parcels 88[6] and 187[7]) at the Ranges Near Training Area T-24A site. Therefore, proposed bedrock monitoring wells will be completed with the screen section of each well installed at an elevation overlapping the elevation of the screened interval of FTA-108-T24A-G01 (approximately 900 to 910 feet mean sea level). The monitoring wells will be installed and developed as specified in Section 4.8 and Appendix C of the SAP.

4.2.3.1 Monitoring Well Locations and Rationale

Permanent residuum and bedrock monitoring well clusters will be installed at locations hydraulically downgradient from FTA-108-T24A-G01. At locations upgradient of FTA-108-T24A-G01 where only residuum wells currently exist, well clusters will be formed by installing a bedrock monitoring well adjacent to the existing residuum monitoring well.

Nine proposed residuum monitoring wells, designated R24A-187-MW01 through R24A-187-MW06, and R24A-187-MW16, R24A-187-MW17, and R24A-187-MW19, will be installed to determine the local groundwater flow direction and delineate the lateral extent of contamination, if any, in the residuum aquifer. Proposed monitoring wells will be placed at locations shown on Figure 4-1. Table 4-1 presents residuum monitoring well sampling rationale.

Ten proposed bedrock monitoring wells designated R24A-187-MW07 through R24A-187-MW15, and R24A-187-MW18 will be installed to determine bedrock groundwater flow direction and to delineate groundwater contamination in the bedrock. The locations of the existing and proposed monitoring wells are presented on Figure 4-1. Table 4-1 presents bedrock monitoring well sampling rationale.

4.2.3.2 Residuum Monitoring Wells

Nine residuum monitoring well boreholes will be drilled and installed using 4.25 -inch inside diameter (ID) hollow-stem augers. If necessary, air rotary methods will be used to advance the residuum boreholes through more competent quartz zones. Residuum monitoring wells will be drilled to a minimum of 15 feet below the first groundwater bearing zone estimated to range from about 30 to 40 feet bgs. The well casing will consist of new 2-inch ID, Schedule 40, threaded, flush-joint, polyvinyl chloride (PVC) pipe. Attached to the bottom of the well casing will be a section of new threaded, flush-joint, 0.010-inch continuous wrap PVC well screen, approximately 10 feet long. Attached to the bottom of the screen will be a sump, approximately 5 feet long, composed of new, 2-inch ID, Schedule 40, threaded, flush joint PVC pipe. After the casing and screen materials are lowered into the boring, a filter pack will be installed around the well screen. The filter pack will be tremied into place from the bottom of the sump to approximately 5 feet above the top of the screen. The filter pack will consist of 20/40 silica sand. A bentonite seal, approximately 5 feet thick, will be placed above the filter pack. The remaining annular space will be grouted with a bentonite-cement mixture (described above) and tremied in place with a side discharge tremie from the top of the bentonite seal to ground surface. The residuum monitoring wells will be developed as specified in Section 4.8 and Appendix C of the SAP. Groundwater samples will not be collected from residuum wells for a period of at least 14 days after well development. Investigation–derived waste (IDW) will be containerized and staged in accordance with Section 5.7 of the SFSP.

4.2.3.3 Bedrock Monitoring Wells

Ten bedrock monitoring well boreholes will be drilled using a combination of hollow-stem auger wireline coring, and air rotary drilling techniques. Estimated bedrock monitoring well depths are included in Table 4-2. Well depths may be modified based on the results of the coring results.

Boreholes to be completed as bedrock monitoring wells will first be advanced using hollow-stem auger drilling and split spoon sampling. Subsurface soil samples will be collected using hollow-stem auger drilling equipment and a 2-inch diameter split spoon sampler (in accordance with American Society for Testing and Materials [ASTM] Method D 1586 [ASTM, 1992]) as specified in Section 4.7.1.2 of the SAP.

Soil samples will be collected at 5-foot intervals from ground surface to split spoon refusal. For the purpose of this supplemental RI, split spoon refusal is defined as less than 6 inches penetration after 50 blows in a standard penetration test. Samples will be collected using a 24-inch-long, 2-inch-diameter split-spoon sampler. Lithologic samples will be collected and described to provide a detailed lithologic log. The soil samples collected will be logged in accordance with ASTM Method D 2488 using the Unified Soil Classification System and screened in the field using a PID (ASTM, 1993). There will not be any samples collected for laboratory analyses. Upon reaching split spoon refusal, the auger stem will remain in the borehole to serve as a temporary casing so that bedrock coring can be conducted.

Upon reaching split spoon sampler refusal, continuous bedrock coring will be performed in accordance with ASTM Method D 2113, Standard Practice for Diamond Core Drilling for Site Investigation (ASTM, 1993). Bedrock coring will be performed with a (PQ) wireline triple tube core barrel with a 10-foot longitudinally split inner tube to collect core samples continuously from split spoon refusal to 5 feet below auger refusal.

Bedrock cores will be described to provide a detailed lithologic log in accordance with methods outlined in CESAS Manual DM 1110-1-1 (USACE, 1983). Structural features such as folding, fracturing and brecciation, which may indicate the presence of faulting, will be noted. Coring will be performed continuously from auger refusal to about 5 feet below the first groundwater bearing.

After advancing to approximately 5 feet below auger refusal, an air rotary rig with a 12-inch percussion bit or rotary bit will be used to ream the borehole from ground surface to the de pth hole is cored. Eight-inch ID carbon steel International Pipe Standard outer casing will be installed into the borehole from ground surface to the bottom of the borehole. A minimum of 2-inch annular space between the outer casing and borehole wall will be required. The 8-inch carbon steel outer casing will be grouted in-place using a tremie pipe suspended in the annulus outside of the casing. Bentonite-cement grout will be mixed using approximately 6.5 to 7 gallons

of water, and 5 pounds of bentonite per 94 pound bag of Type I Portland cement. After the grout has cured a minimum of 48 hours, a PQ wireline core barrel will be used to collect continuous bedrock core and to advance the borehole to the target depth (Table 4-1). Target depths were determined based on the elevation of the well screen interval of FTA-108-T24A-G01. The depth into competent bedrock will be increased if groundwater is not encountered. After completion of core sample collection, a 7-7/8-inch air percussion bit will be used to ream the hole from the bottom of the surface casing to the borehole target depth. The compressor on the drill rig will be equipped with an air filter between the compressor and the drill bit.

Four-inch monitoring wells will be installed inside the outer casing at each proposed bedrock well location. The well casing will consist of new, 4-inch ID, Schedule 80, threaded, flush-joint, PVC pipe. Attached to the bottom of the well casing will be a section of new threaded, flush joint 0.010-inch continuous wrap PVC well screen approximately 10 feet long. Attached to the bottom of the screen will be a sump, approximately 5 feet long, composed of new, 4-inch ID, Schedule 80, threaded, flush joint PVC pipe. After the casing and screen materials are lowered into the boring, a filter pack will be installed around the well screen. The filter pack will be tremied into place from the bottom of the sump to approximately 5 feet above the top of the screen. The filter pack will consist of 20/40 silica sand. A bentonite seal, approximately 5 feet thick, will be placed above the filter pack. The remaining annular space will be grouted with a bentonite-cement mixture (described above) and tremied in place with a side discharge tremie from the top of the bentonite seal to ground surface. The bedrock monitoring wells will be developed as specified in Section 4.8 and Appendix C of the SAP. Groundwater samples will not be collected from bedrock wells for a period of at least 14 days after well development. IDW will be containerized and staged in accordance with Section 5.7 of the SFSP.

4.2.4 Monitoring Well Groundwater Sampling

Thirty-seven groundwater samples will be collected from the 18 existing wells and 19 proposed monitoring wells at the Ranges Near Training Area T-24A to determine the nature and extent of CWM breakdown products, metals, VOCs, SVOC, and explosives in groundwater.

4.2.4.1 Monitoring Well Sample Locations and Rationale

The groundwater sampling rationale are presented in Table 4-1. A total of 37 groundwater samples will be collected at the Ranges Near Training Area T-24A. The existing and proposed permanent monitoring well locations are presented on Figure 4-1.

4.2.4.2 Monitoring Well Sample Collection

Prior to sampling monitoring wells, static water levels will be measured from the 37 monitoring wells to be sampled as part of the supplemental RI. Groundwater elevations will be used to define the groundwater flow in the residuum and bedrock aquifers. Water levels will be measured as outlined in Section 4.18 of the SAP. Groundwater samples will be collected from the existing and proposed permanent monitoring wells for the parameters listed in Table 4-3. Monitoring well locations are presented on Figure 4-1. Groundwater samples will be collected in accordance with the procedures outlined in Section 4.9.1.4 of the SAP.

Sample documentation and chain of custody will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.5 Surface Water Sampling

Seven surface water samples will be collected from the ephemeral and perennial streams that flow in the vicinity of the Ranges Near Training Area T-24A.

4.2.5.1 Surface Water Sample Locations and Rationale

Surface water sampling rationale is listed in Table 4-1. Surface water samples will be collected from the proposed locations on Figure 4-1. Surface water sample designations and required QA/QC samples are listed in Table 4-4. The exact sampling locations will be determined in the field by the ecological sampler, based on drainage pathways and actual field observations.

4.2.5.2 Sample Collection

Surface water samples will be collected in accordance with the procedures specified in Section 4.9.1.3 of the SAP. Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. The samples will be analyzed for the parameters listed in Section 4.5.

Table 4-3

Groundwater Sample Designations and QA/QC Sample Quantities
Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples		
				Field Duplicates	Field Splits	MS/MSD
R24A-187-MW01	R24A-187-MW01-GW-JG3001-REG	Groundwater	a			R24A-187-MW01-GW-JG3001-MS/MSD
R24A-187-MW02	R24A-187-MW02-GW-JG3002-REG	Groundwater	a			
R24A-187-MW03	R24A-187-MW03-GW-JG3003-REG	Groundwater	a			
R24A-187-MW04	R24A-187-MW04-GW-JG3004-REG	Groundwater	a			
R24A-187-MW05	R24A-187-MW05-GW-JG3005-REG	Groundwater	a	R24A-187-MW05-GW-JG3006-FD	R24A-187-MW05-GW-JG3007-FS	
R24A-187-MW06	R24A-187-MW06-GW-JG3008-REG	Groundwater	a			
R24A-187-MW07	R24A-187-MW07-GW-JG3009-REG	Groundwater	a			
R24A-187-MW08	R24A-187-MW08-GW-JG3010-REG	Groundwater	a			
R24A-187-MW09	R24A-187-MW09-GW-JG3011-REG	Groundwater	a			
R24A-187-MW10	R24A-187-MW10-GW-JG3012-REG	Groundwater	a			
R24A-187-MW11	R24A-187-MW11-GW-JG3013-REG	Groundwater	a			R24A-187-MW11-GW-JG3013-MS/MSD
R24A-187-MW12	R24A-187-MW12-GW-JG3014-REG	Groundwater	a			
R24A-187-MW13	R24A-187-MW13-GW-JG3015-REG	Groundwater	a			
R24A-187-MW14	R24A-187-MW14-GW-JG3016-REG	Groundwater	a			
R24A-187-MW15	R24A-187-MW15-GW-JG3017-REG	Groundwater	a	R24A-187-MW15-GW-JG3018-FD		

Table 4-3

Groundwater Sample Designations and QA/QC Sample Quantities
Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples		
				Field Duplicates	Field Splits	MS/MSD
R24A-187-MW16	R24A-187-MW16-GW-JG3019-REG	Groundwater	a			
R24A-187-MW17	R24A-187-MW17-GW-JG3020-REG	Groundwater	a			
R24A-187-MW18	R24A-187-MW18-GW-JG3021-REG	Groundwater	a			
R24A-187-MW19	R24A-187-MW18-GW-JG3022-REG	Groundwater	a			
FTA-108-T24A-G01	FTA-108-T24A-GO1-GW-JG3023-REG	Groundwater	87-97'			
FTA-108-T24A-G02	FTA-108-T24A-GO2-GW-JG3024-REG	Groundwater	17-27'			
FTA-108-T24A-G03	FTA-108-T24A-GO3-GW-JG3025-REG	Groundwater	26-36'			
FTA-108-GP01	FTA-108-GP01-GW-JG3026-REG	Groundwater	9-24'			
FTA-108-GP02	FTA-108-GP02-GW-JG3027-REG	Groundwater	9-24'			
FTA-108-GP03	FTA-108-GP03-GW-JG3028-REG	Groundwater	8-23'			
FTA-108-GP04	FTA-108-GP04-GW-JG3029-REG	Groundwater	14-29'			
FTA-108-GP05	FTA-108-GP05-GW-JG3030-REG	Groundwater	9-24'			
FTA-108-GP06	FTA-108-GP06-GW-JG3031-REG	Groundwater	4-14'			
FTA-108-GP07	FTA-108-GP07-GW-JG3032-REG	Groundwater	4-14'			
FTA-108-GP08	FTA-108-GP08-GW-JG3033-REG	Groundwater	22-42'			
FTA-108-GP09	FTA-108-GP09-GW-JG3034-REG	Groundwater	21-41'			

Table 4-3

Groundwater Sample Designations and QA/QC Sample Quantities
Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples		
				Field Duplicates	Field Splits	MS/MSD
FTA-108-GP10	FTA-108-GP10-GW-JG3035-REG	Groundwater	20-35'			FTA-108-GP10-GW-JG3035-MS/MSD
FTA-88-GP01	FTA-88-GP01-GW-JG3036-REG	Groundwater	4-19'			
FTA-88-GP02	FTA-88-GP02-GW-JG3037-REG	Groundwater	4-19'			FTA-88-GP02-GW-JG3037-MS/MSD
FTA-88-GP03	FTA-88-GP03-GW-JG3038-REG	Groundwater	14-29'	FTA-88-GP03-GW-JG3039-FD	FTA-88-GP03-GW-JG3040-FS	
FTA-88-GP04	FTA-88-GP04-GW-JG3041-REG	Groundwater	5-15'			
FTA-108-BK-G06	FTA-108-BK-G06-GW-JG3042-REG	Groundwater	9-19'	FTA-108-BK-G06-GW-JG3043-FD		

FD - Field duplicate.
FS - Field split.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.
CWM-chemical warfare material

Table 4-3

Groundwater Sample Designations and QA/QC Sample Quantities
Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Analytical Suite
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products

Table 4-3

Groundwater Sample Designations and QA/QC Sample Quantities
Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Analytical Suite
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and

Table 4-3

Groundwater Sample Designations and QA/QC Sample Quantities
Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Analytical Suite
Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products

Table 4-4

Surface Water and Sediment Sample Designations and QA/QC Sample Quantities
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples			Analytical Suite
				Field Duplicates	Field Splits	MS/MSD	
R24A-187-SW/SD01	R24A-187-SW/SD01-SW-JG2001-REG R24A-187-SW/SD01-SD-JG1001-REG	Surface Water Sediment	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD02	R24A-187-SW/SD02-SW-JG2002-REG R24A-187-SW/SD02-SD-JG1002-REG	Surface Water Sediment	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD03	R24A-187-SW/SD03-SW-JG2003-REG R24A-187-SW/SD03-SD-JG1003-REG	Surface Water Sediment	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD04	R24A-187-SW/SD04-SW-JG2004-REG R24A-187-SW/SD04-SD-JG1004-REG	Surface Water Sediment	a			R24A-187-SW/SD04-SW-JG2004-MS R24A-187-SW/SD04-SD-JG1004-MSD	TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD05	R24A-187-SW/SD05-SW-JG2005-REG R24A-187-SW/SD05-SD-JG1005-REG	Surface Water Sediment	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD06	R24A-187-SW/SD06-SW-JG2006-REG R24A-187-SW/SD06-SD-JG1006-REG	Surface Water Sediment	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD07	R24A-187-SW/SD07-SW-JG2007-REG R24A-187-SW/SD07-SD-JG1007-REG	Surface Water Sediment	a	R24A-187-SW/SD07-SW-JG2008-DUP R24A-187-SW/SD07-SD-JG1008-DUP	R24A-187-SW/SD07-SW-JG2009-FS R24A-187-SW/SD07-SD-JG1009-FS		TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)

FD - Field duplicate.
FS - Field split.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.
CWM-chemical warfare material

4.2.6 Sediment Sampling

Seven sediment samples will be collected from the Ranges Near Training Area T-24A. These sediment samples will be collected at the same locations as the surface water samples described in Section 4.2.5.

4.2.6.1 Sediment Sample Locations and Rationale

The proposed locations for sediment samples are shown in Figure 4-1. The sediment sampling rationale is presented in Table 4-1. The sediment sample designation and QA/QC sample requirements are listed in Table 4-4. The actual sediment sample points will be at the discretion of the ecological sampler, based on the drainage pathways and actual field observations.

4.2.6.2 Sample Collection

Sediment samples will be collected in accordance with the procedures specified in Section 4.9.1.2 of the SAP. Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. The sediment samples will be analyzed for the parameters listed in Section 4.5.

4.2.7 Decontamination Requirements

Decontamination will be performed on sampling and nonsampling equipment primarily to ensure that contaminants are not introduced into samples from location to location. Decontamination of sampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.1 of the SAP. Decontamination of nonsampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.2 of the SAP.

4.2.8 Surveying of Sample Locations

Sampling locations will be marked with pin flags, stakes, and/or flagging and will be surveyed using either global positioning system (GPS) or conventional civil survey techniques, as necessary to obtain the required level of accuracy. Horizontal coordinates will be referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum 1983. Elevations will be referenced to the North American Vertical Datum of 1988.

Horizontal coordinates for soil locations will be recorded using a GPS to provide accuracy within 1 meter. Because of the need to use monitoring wells to determine water levels, a higher level of survey accuracy is required. Monitoring wells will be surveyed to an accuracy of 0.1 foot for horizontal coordinates and 0.01 foot for elevations, using survey-grade GPS techniques and/or

conventional civil survey techniques, as required. Procedures to be used for GPS surveying are described in Section 4.3 of the SAP. Conventional land survey requirements are presented in Section 4.19 of the SAP. All areas at this site must be cleared for UXO avoidance before any surveying activities will commence.

4.2.9 Analytical Program

Samples collected at the locations specified in Table 4-1 will be analyzed for various chemical constituents (including CWM breakdown products) and physical properties based on the PSSCs historically used at the site and EPA, ADEM, FTMC, and USACE requirements. Target analyses for groundwater and subsurface soil samples collected from the Ranges Near Training Area T-24A include:

- Target compound list VOCs by EPA Method 5035/8260B
- TCL SVOCs by EPA Method 8270C
- Target analyte list metals by EPA Method 6010B/7000
- CWM breakdown products by EPA Method 8270 (modified) and Method 8321
- Nitroexplosives by EPA Method 8330.

The surface soil samples will be analyzed for the following list of parameters:

- Target compound list SVOCs by EPA Method 8270C
- Target analyte list metals by EPA Method 6010B/7000
- CWM breakdown products by EPA Method 8270 (modified) and Method 8321
- Nitroexplosives by EPA Method 8330.

The samples will be analyzed using EPA SW-846 Update III Method where applicable, as presented in Table 4-5 of this SFSP and Table 6-1 of the QAP. Data will be reported and evaluated in accordance with CESAS Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard copy data packages by the laboratory using CLP-like forms. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

4.2.10 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping will follow the procedures specified in Section 4.13.2 of the SAP. Completed analysis request/COC records will be secured and included with each shipment of coolers to both laboratories.
The addresses are:

Table 4-5

Analytical Samples
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples: No. of Sample Points	Field Samples: No. of Events	Field Samples: No. of Field Samples	QA/QC Samples[a]: Field Dups (10%)	QA/QC Samples[a]: Splits w/ QA Lab (5%)	QA/QC Samples[a]: MS/MSD (5%)	QA/QC Samples[a]: Trip Blank (1/ship)	QA/QC Samples[a]: Eq. Rinse (1/wk/matrix)	Quanterra: Total No. Analysis	QA Lab: Total No. Analysis
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q: 37 groundwater samples and 29 surface soil samples, 8 subsurface soil samples, 7 surface water, 7 sediment													
TCL VOCs	8260B	water	normal	44	1	44	4	2	4		1	57	2
TCL SVOCs	8270C	water	normal	44	1	44	4	2	4		1	57	2
TAL Metals	6010B/7000	water	normal	44	1	44	4	2	4		1	57	2
Nitroexplosives	8330	water	normal	44	1	44	4	2	4		1	17	2
CWM Bkdn Products	8321/8270M	water	normal	44	1	44	4	2	4		1	17	2
TCL VOCs	8260B	soil	normal	16	1	16	1	1	1		1	20	1
TCL SVOCs	8270C	soil	normal	44	1	44	4	2	4		1	57	2
TAL Metals	6010B/7000	soil	normal	44	1	44	4	2	4		1	57	2
Nitroexplosives	8330	soil	normal	44	1	44	4	2	4		1	57	2
CWM Bkdn Products	8321/8270M	soil	normal	44	1	44	4	2	4		1	57	2
TOC	9060	sediment	normal	7	1	7						7	0
Grain Size	ASTM421/422	sediment	normal	7	1	7						7	0
Ranges Near Training Area T-24A Subtotal:				426			37	19	37	0	10	467	19

[a]Field duplicate, QA split, and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number.
Trip blank samples will be collected in association with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that are anticipated to last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

Ship samples to:
Quanterra Environmental Services
5815 Middlebrook Pike
Knoxville, Tennessee 37921
Attn: John Reynolds
Tel: 423-588-6401
Fax: 423-584-4315

USACE Laboratory split samples are shipped to:
U.S. Army Engineer District, Savannah
Environmental & Materials District
Attn: Sample Receiving
200 North Cobb Parkway
Building 400, Suite 404
Marietta, Georgia 30062
Tel: 678-354-0310

MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
SVOC - Semivolatile organic compound.
VOC - Volatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
TOC - Total organic carbon.
ASTM- American Society for Testing and Materials
CWM Bkdn - chemical warfare material breakdown

Quanterra-Knoxville
Attention: Sample Receiving
Quanterra Environmental Services
5815 Middlebrook Pike
Knoxville, Tennessee 37921
Telephone: (865) 588-6401.

QA split samples collected for the USACE laboratory will be shipped to the following address:

U.S. Army Engineer District, Savannah
Environmental & Materials Unit
Attn: Sample Receiving
200 North Cobb Parkway
Building 400, Suite 404
Marietta, Georgia 30062
Telephone: (678) 354-0310.

4.2.11 Investigation-Derived Waste Management

Management and disposal of the IDW will follow procedures and requirements as described in Appendix D of the SAP (IT, 2000a). The IDW expected to be generated at the Ranges Near Training Area T-24A site will include drill cuttings, purge water from monitoring well development and sampling activities, decontamination fluids, and disposable personal protective equipment. The IDW will be staged within the fenced area surrounding Buildings 335 and 336 while awaiting characterization and final disposal.

4.2.12 Site-Specific Safety and Health

Safety and health requirements for the supplemental RI are provided in the SSHP attachment for the Ranges Near Training Area T-24A site. The SSHP attachment will be used in conjunction with the SHP.

5.0 Project Schedule

The project schedule for the supplemental RI activities will be provided by the IT project manager to the BRAC Cleanup Team and will be in accordance with the WP.

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ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

3D	3D International Environmental Group
Abs	skin absorption
AC	hydrogen cyanide
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded
ACGIH	American Conference of Governmental Industrial Hygienists
ADEM	Alabama Department of Environmental Management
AEL	airborne exposure limit
AL	Alabama
amb.	amber
ANAD	Anniston Army Depot
APT	armor-piercing tracer
ASP	Ammunition Supply Point
ASR	Archives Search Report
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
B	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)
BCT	BRAC Cleanup Team
BFB	bromofluorobenzene
bgs	below ground surface
bkg	background
bls	below land surface
BOD	biological oxygen demand
BRAC	Base Realignment and Closure
Braun	Braun Intertec Corporation
BTEX	benzene, toluene, ethylbenzene, and xylenes
BTOC	below top of casing
BZ	breathing zone; 3-quinuclidinyl benzilate
C	ceiling limit value
Ca	carcinogen
CCAL	continuing calibration
CCB	continuing calibration blank
CD	compact disc
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
CFC	chlorofluorocarbon
CG	cyanogen chloride
ch	inorganic clays of high plasticity
CK	carbonyl chloride
cl	inorganic clays of low to medium plasticity
Cl.	chlorinated
CLP	Contract Laboratory Program
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
COC	chain of custody
COE	Corps of Engineers
Con	skin or eye contact
CRL	certified reporting limit
CRZ	contamination reduction zone
CS	ortho-chlorobenzylidene-malononitrile
CSEM	conceptual site exposure model
ctr.	container
CWA	chemical warfare agent
CWM	chemical warfare material; clear, wide mouth
CX	dichloroformoxime
D	duplicate
DANC	decontamination agent, non-corrosive
ºC	degrees Celsius
ºF	degrees Fahrenheit
DDT	dichlorodiphenyltrichloroethane
DEP	depositional soil
DI	deionized
DIMP	di-isopropylmethylphosphonate
DMMP	dimethylmethylphosphonate
DOD	U.S. Department of Defense
DP	direct-push
DPDO	Defense Property Disposal Office
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DRO	diesel range organics
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
E&E	Ecology and Environment, Inc.
EBS	environmental baseline survey
Elev.	elevation
EM	electromagnetic
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive and ordnance disposal
EODT	explosive and ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
ER	equipment rinsate
ESE	Environmental Science and Engineering, Inc.
ESV	ecological screening value
Exp.	explosives
E-W	east to west
EZ	exclusion zone
FB	field blank
FD	field duplicate
FedEx	Federal Express, Inc.
FFE	field flame expedient
Fil	filtered
Flt	filtered
FMP 1300	Former Motor Pool 1300
Frtn	fraction
FS	field split
ft	feet
ft/ft	feet per foot
FTA	Fire Training Area
FTMC	Fort McClellan
g	gram
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
gal	gallon
gal/min	gallons per minute
GB	sarin
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GC/MS	gas chromatograph/mass spectrometer
GFAA	graphite furnace atomic absorption
gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GS	ground scar
GSA	General Services Administration
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GST	ground stain
GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
HA	hand auger
HCl	hydrochloric acid
HD	distilled mustard
HDPE	high-density polyethylene
Herb.	herbicides
HNO_3	nitric acid
hr	hour
H&S	health and safety
HSA	hollow-stem auger
HTRW	hazardous, toxic, and radioactive waste
I	out of control, data rejected due to low recovery
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICS	interference check sample

List of Abbreviations and Acronyms (Continued)

ID	inside diameter
IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDW	investigation-derived waste
IMPA	isopropylmethyl phosphonic acid
in.	inch
Ing	ingestion
Inh	inhalation
IP	ionization potential
IPS	International Pipe Standard
IRDMIS	Installation Restoration Data Management Information System
IT	IT Corporation
ITEMS	IT Environmental Management System ™
J	estimated concentration
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes
K	conductivity
L	lewisite; liter
LC_{50}	lethal concentration for 50 percent of population tested
LD_{50}	lethal dose for 50 percent of population tested
l	liter
LCS	laboratory control sample
LEL	lower explosive limit
LT	less than the certified reporting limit
max	maximum
MDL	method detection limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils
MHz	megahertz
µg/g	micrograms per gram
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µmhos/cm	micromhos per centimeter
min	minimum
MINICAMS	miniature continuous air sampling system
ml	inorganic silts and very fine sands
mL	milliliter
mm	millimeter
MM	mounded material
MOGAS	motor vehicle gasoline
MPA	methyl phosphonic acid
MR	molasses residue
MS	matrix spike
mS/cm	millisiemens per centimeter
MSD	matrix spike duplicate
msl	mean sea level
MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded
mV	millivolts
MW	monitoring well
N/A	not applicable; not available
NAD	North American Datum
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
ND	not detected
NE	no evidence
NFA	No Further Action
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
NIC	notice of intended change
NIOSH	National Institute for Occupational Safety and Health
No.	number
NOAA	National Oceanic and Atmospheric Administration
NR	not requested
ns	nanosecond
N-S	north to south
nT	nanotesla
NTU	nephelometric turbidity unit
O&G	oil and grease
OD	outside diameter
OE	ordnance and explosives
oh	organic clays of medium to high plasticity
ol	organic silts and organic silty clays of low plasticity
OP	organophosphorus
OSHA	Occupational Safety and Health Administration
OWS	oil/water separator
oz	ounce
PAH	polynuclear aromatic hydrocarbon
Pb	lead
PCB	polychlorinated biphenyl
PCE	perchloroethene
PDS	Personnel Decontamination Station
PEL	permissible exposure limit
Pest.	pesticide
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
POL	petroleum, oils, and lubricants
PP	peristaltic pump
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PPMP	Print Plant Motor Pool
ppt	parts per thousand
PSSC	potential site-specific chemical
pt	peat or other highly organic silts
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QAP	installation-wide quality assurance plan
QC	quality control
QST	QST Environmental Inc.
qty	quantity
Qual	qualifier
R	rejected
RCRA	Resource Conservation and Recovery Act
RDX	cyclonite
ReB3	Rarden silty clay loams
REG	field sample
REL	recommended exposure limit
RFA	request for analysis
RI	remedial investigation
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
RTK	real-time kinematic
SAD	South Atlantic Division
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan
sc	clayey sands; sand-clay mixtures
Sch.	schedule
SD	sediment
SDG	sample delivery group
SDZ	safe distance zone; surface danger zone
SEMS	Southern Environmental Management & Specialties
SFSP	site-specific field sampling plan
SGF	standard grade fuels
SHP	installation-wide safety and health plan
SI	site investigation
SL	standing liquid
sm	silty sands; sand-silt mixtures
SOP	standard operating procedure
sp	poorly graded sands; gravelly sands
SP	sump pump
Ss	stony rough land, sandstone series
SS	surface soil
SSC	site-specific chemical
SSHO	site safety and health officer
SSHP	site-specific safety and health plan

SSSL	site-specific screening level
STB	supertropical bleach
STEL	short-term exposure limit
STOLS	Surface Towed Ordnance Locator System®
Std. units	standard units
SU	standard unit
SVOC	semivolatile organic compound
SW	surface water
SW-846	U.S. EPA *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*
SZ	support zone
TAL	target analyte list
TAT	turn around time
TB	trip blank
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TERC	Total Environmental Restoration Contract
TIC	tentatively identified compounds
TLV	threshold limit value
TN	Tennessee
TOC	top of casing, total organic carbon
TPH	total petroleum hydrocarbons
TRADOC	U.S. Army Training and Doctrine Command
TRPH	total recoverable petroleum hydrocarbons
TWA	time weighted average
UCL	upper confidence limit
UCR	upper certified range
UJ	not detected above reporting limit; result should be estimated
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USAMCLS	U.S. Army Chemical School
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
UXO	unexploded ordnance
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validation qualifier
VX	nerve agent (O-ethyl-S- [diisoproplaminoethyl]-methylphosphonothiolate)
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd^3	cubic yards

ATTACHMENT 2

RESPONSE TO COMMENTS

APPENDIX A

BORING LOGS AND WELL LOGS, PARCEL 108(7) AND 88(6)

APPENDIX B

ANALYTICAL DATA, HISTORIC DATA AND SI RESULTS OF PARCELS 108(7), 88(6)